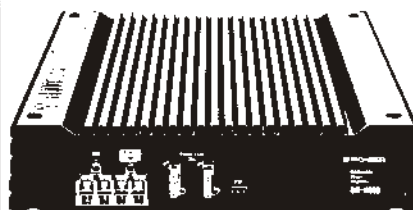


Service Manual

PIONEER
The Art of Entertainment

● GM-H200/UC



ORDER NO.
CRT1381

BRIDGEABLE POWER AMPLIFIER

GM-H200 UC

GM-4200 EW

NOTE:

- In this unit, an electric current of about 40A flows at the continuous power output of 4Ω and a current close to 60A flows at 2Ω. Even when there is no signal, a current around 4A flows. Therefore, make a test at an appropriate signal level in consideration of the power consumption of the power supply unit.

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SAFETY INFORMATION (UC MODEL)

CAUTION

This service manual is intended for qualified service technicians; it is not meant for the casual do-it-yourselfer. Qualified technicians have the necessary test equipment and tools, and have been trained to properly and safely repair complex products such as those covered by this manual. Improperly performed repairs can adversely affect the safety and reliability of the product and may void the warranty. If you are not qualified to perform the repair of this product properly and safely, you should not risk trying to do so and refer the repair to a qualified service technician.

WARNING

Lead in solder used in this product is listed by the California Health and Welfare agency as a known reproductive toxicant which may cause birth defects or other reproductive harm (California Health & Safety Code, Section 25249.5). When servicing or handling circuit boards and other components which contain lead in solder, avoid unprotected skin contact with the solder. Also, when soldering do not inhale any smoke or fumes produced.

1. SPECIFICATIONS

● GM-H200/UC

Power source14.4 V DC (10.8 - 15.6 V allowable)
 Grounding system Negative type
 Current consumption 40 A (at continuous power, 4Ω)
 Average current drawn* 13 A (4Ω for two channels)
 18 A(4Ω for one channel)
 Fuse..... 30 A×2
 Dimensions264 (W) × 58 (H) × 335 (D) mm
 [10 - 3/8 (W) × 2 - 1/4 (H) × 13 - 1/4 (D) in.]
 Weight7.0 kg (15.4 lbs.)(Leads for wiring not included)
 Maximum power output200 W × 2/600 W × 1 (EIAJ)
 Continuous power output
100 W × 2/300 W × 1 (at 4Ω, 20 - 20,000 Hz, 0.05% THD)
 150 W × 2 (at 2Ω, 20 - 20,000 Hz, 0.05% THD)
 Load impedance4Ω (2 - 8Ω allowable)
 Frequency response 10 - 50,000 Hz (+0 dB, -1 dB)
 Signal-to-noise ratio 105 dB (IHF - A network)
 Distortion 0.001% (at 20 W, 1 kHz)
 Separation70 dB (1 kHz)
 Input level0.2 - 2 V /8 kΩ

These specifications were determined and are presented in accordance with specification standards established by the Ad Hoc Committee of Car Stereo Manufacturers.

Note:

Specifications and the design are subject to possible modification without notice due to improvements.

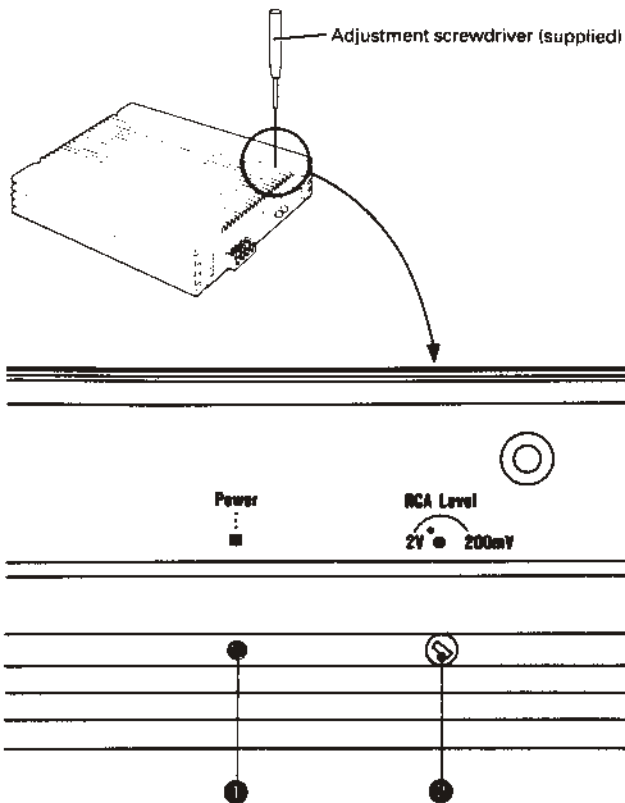
● GM-4200/EW

Power source 14.4 V DC (10.8 - 15.6 V allowable)
 Grounding system Negative type
 Current consumption 40 A (at continuous power, 4Ω)
 Average current drawn * 13 A (4Ω for two channels)
 18 A (4Ω for one channel (2Ω position))
 Fuse 30 A × 2
 Dimensions 264 (W) × 58 (H) × 335 (D) mm
 Weight 7.0 kg (Leads for wiring not included)
 Maximum power output 240 W × 2/640 W × 1 (EIAJ)
 Continuous power output
 120 W × 2/320 W × 1 (at 4Ω, 20 - 20,000 Hz, 0.05% THD)
 160 W × 2 (at 2Ω, 20 - 20,000 Hz, 0.05% THD)
 Load impedance 4Ω (2 - 8Ω allowable)
 Frequency response 5 - 50,000 Hz (+0 dB, -1 dB)
 Signal-to-noise ratio 105 dB (IEC - A network)
 Distortion 0.0009% (at 20 W, 1 kHz)
 Separation 70 dB (1 kHz)
 Input level RCA: 0.4 - 4 V /8 kΩ
 DIN: 70 - 500mV /22 kΩ

Note:

Specifications and the design are subject to possible modification without notice due to improvements.

2. CONTROLS AND THEIR USE (UC MODEL)



① Power Indicator

The power indicator lights when the power is switched on.

② RCA Input Level Control

Adjusting the RCA input level control will help match the output of the car stereo to the Pioneer amplifier. If the output is low even when the volume of the car stereo is turned up, turn this control clockwise. If there is distortion when the volume of the car stereo is turned up, turn this control counterclockwise.

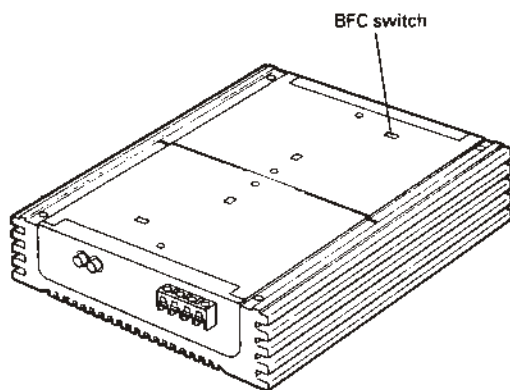
- Adjust control ② with the supplied adjustment screwdriver. Keep the screwdriver if you need to readjust the controls later.

BFC (Beat Frequency Control) switch

Note:

Beating is the combining of two or more frequencies to produce sum and difference frequencies called beats.

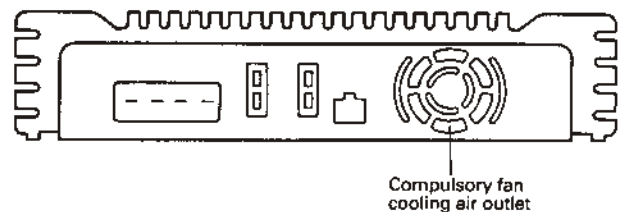
If beating is heard when listening to AM stations on your car radio, change the position of the BFC switch on the bottom of the amplifier with a small flat-bladed screwdriver.



Compulsory fan cooling system

This is a high-power amplifier, so it produces a lot of heat. To keep it cool, it has fan cooling.

- When the power of the car stereo is turned on, the compulsory cooling fan of this power amplifier works automatically and cools inside of this amplifier.
- Install the amplifier so there is enough space front and back to allow the fan cooling to work properly. If the front or back side is covered, the amplifier may malfunction or fail.



3. CONNECTING THE UNITS (UC MODEL)

WARNINGS

- When routing leads and cords, secure them with cable retainers and electrician's adhesive tape. Also, to prevent any damage to the insulation on the leads and cords, protect them with electrician's adhesive tape wherever they touch sharp edges. Be sure to use a rubber O-ring grommet when routing wires through metal, such as the firewall between the engine and passenger compartments.
 - Keep all wiring away from hot surfaces or heater outlets to prevent short circuits.
 - Amplifier ground connections (Black) should only be made to the vehicle's metal body or chassis for safety reasons. The ground circuit carries the same current as the power lead from the vehicle's battery. To get good contact when grounding, sand the metal surface to expose the bare metal. If using multiple amplifiers, connect all amplifier ground leads to the same point to prevent noise problems.
 - Always connect the supplied special (red) battery lead directly to the positive (+) terminal of the battery.
- It is recommended that the speakers connected to the amplifier have the minimum ratings shown below. If a speaker has a rating below what is recommended, it may be damaged when the volume is turned up. The speaker impedance must be 2 to 8 ohms.

Mode	Speaker ratings	
	Maximum	200 W
Two-channel	Nominal	100 W
	Maximum	600 W
One-channel	Nominal	300 W

In the case of a full-range speaker, use one whose maximum rating is higher than the maximum rating shown. In the case of a sub-woofer, use one whose nominal rating is higher than the nominal rating shown.

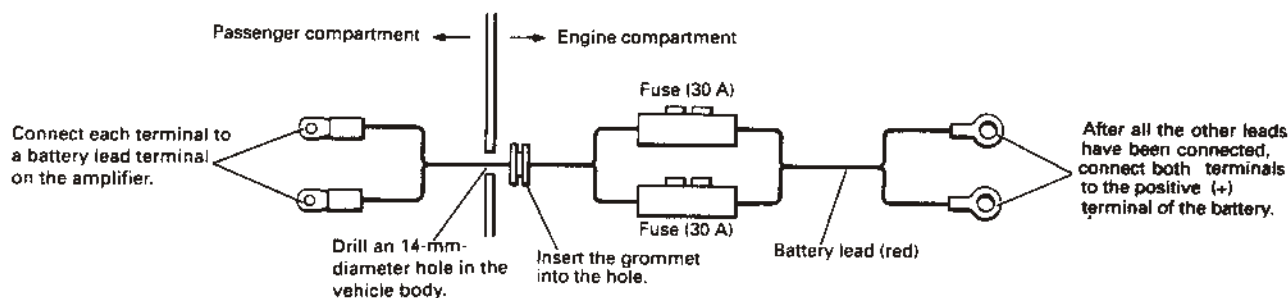
- Never connect a speaker lead to ground or to other speaker grounds. The protection circuitry will operate instantaneously, turning off the amplifier.
- To prevent noise problems, keep the amplifier power leads away from the signal cords (RCA cords) and speaker leads. Also, keep the power leads away from any antenna cords.
- Before finalizing the installation, turn everything on, and make sure everything works correctly and listen for noise in the system.
- For detailed information on connections between different units and the amplifier, use the instruction manuals for the units. It is important to follow their recommendations precisely.

Connecting the special red battery lead

Use the special (red) battery lead supplied with the amplifier. This lead contains the appropriately rated fuse (30-amp fuse (x2)). This special (red) battery lead is made of heavy gauge wire so it is capable of carrying substantial amounts of current. Connect both of the two terminals at each end of the battery lead securely. Should any one terminal come loose, there may be a short circuit, perhaps causing electric shock or even a fire.

Route the special battery lead from the engine compartment through the firewall or vehicle body to the passenger compartment and connect it to the amplifier.

Drill an 14-mm diameter hole in the firewall or vehicle body and insert an O-ring rubber grommet and pull the battery lead through into the passenger compartment.



After making all other connections at the amplifier, connect the battery lead terminal of the amplifier to the positive (+) terminal of the battery.

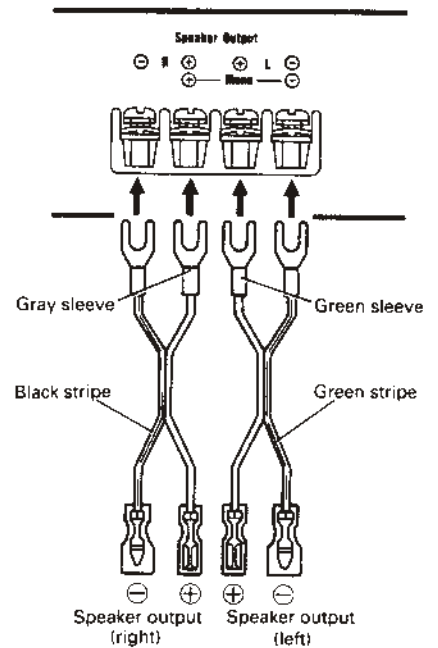
Connecting the leads (supplied)

Connecting the speaker leads

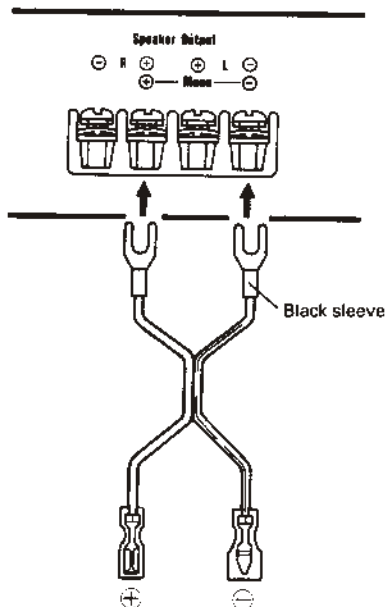
The speaker output mode can be two-channel (stereo), one-channel (mono), or three-channel (stereo + mono). Connect the speaker leads to suit the mode. To connect the speaker leads to the speaker terminals of the amplifier, see the connection diagram for each channel. Be careful with the polarity (+ and -), and with which channel is which (left [L] and right [R]).

- If the amplifier is used in three-channel mode, inductors and capacitors are needed. For more information, see "Three-channel mode (stereo + mono)".

Two-channel mode (stereo)



One-channel mode (mono)

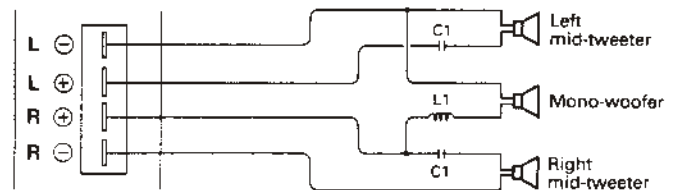


The following examples (1 and 2) require advanced understanding of electronics. If you do not understand the diagram, please have the work done by your nearest authorized Pioneer installation specialist.

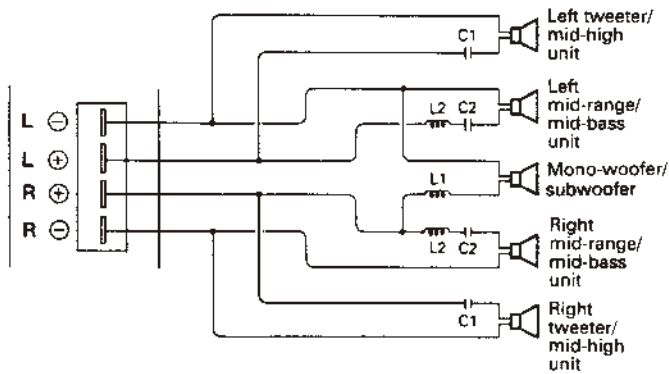
Three-channel mode (stereo + mono)

The power amplifier is basically a two-channel/one-channel bridgeable amplifier, but three channels can be achieved by combining the stereo and mono modes using inductors and capacitors. Some typical examples are given below.

Example 1 Three-channel, two-way system



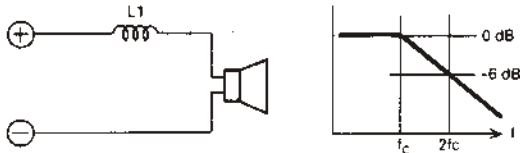
Example 2 Three-channel, three-way system



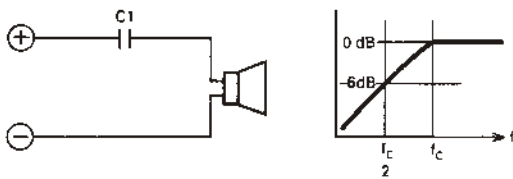
- The inductor (L1 or L2 in the diagram) acts as a low-pass filter. The capacitor (C1 or C2 in the diagram) acts as a high-pass filter.
- In the three-channel mode Pioneer recommends that an inductor (L) be used on the woofer/subwoofer, and that a capacitor (C) be used on the midrange/tweeter. Remember when bridging an amplifier it will see only half of the original speaker impedance. Therefore, you must use speakers that have ratings of 4 ohms or higher. If you use speakers that have lower impedance ratings it may cause damage to the amplifier.
- When the inductors and capacitors are connected to the speaker leads, secure or solder them so they cannot be pulled loose. Tape or use heat shrink on the joints to prevent short circuits.

Setting the filter constant

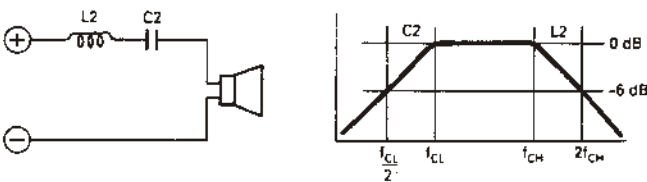
1 Low-pass filter (for subwoofer/woofer): 6 dB/octave



2 High-pass filter (for mid-tweeter/mid-high-tweeter): 6 dB/octave



3 Band-pass filter (combination of low-pass filter and high-pass filter for mid-bass/mid): 6 dB/octave



Component Guide

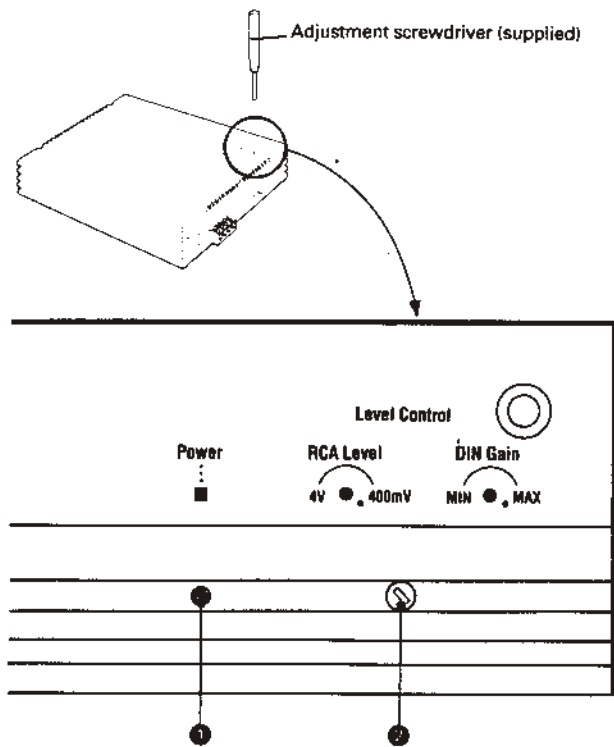
Speaker load impedance	2Ω		4Ω		8Ω	
	L (mH)	C (μF)	L (mH)	C (μF)	L (mH)	C (μF)
50	6.4	1600	12.7	800	25.5	400
80	4.0	1000	8.0	500	16	250
125	2.5	560	5.1	300	10	160
200	1.6	400	3.2	200	6.4	100
320	1.0	250	2.0	125	4	62
500	0.64	160	1.3	80	2.6	40
800	0.4	100	0.8	50	1.6	25
1250	0.25	64	0.5	30	1.0	16
2000	0.16	40	0.3	20	0.64	10
3200	0.1	25	0.2	12.5	0.4	6.2
5000	0.06	16	0.13	8	0.26	4
8000	0.04	10	0.08	5	0.16	2.5
10000	0.03	8	0.06	4	0.13	2

- A multi-channel system can be set up using a combination of filters 1, 2, and 3. The inductance (L) and capacitance (C) will determine the frequency (Hz) that the speaker will reproduce. Refer to the chart on the above to determine the components required.

WARNING

- Use the capacitors specified. Non-polarized capacitors rated at over ±40 V should be used for C1 and C2 in the diagram. Because of the voltage output of the amplifier it is very important to use non-polarized capacitors rated at or over 40 V. This will prevent a safety hazard.

4. CONTROLS AND THEIR USE (EW MODEL)



1 Power Indicator

The power indicator lights when the power is switched on.

2 DIN input gain and RCA input level controls

The DIN input gain and RCA input level controls are used to adjust the DIN input gain and RCA input level, respectively. Set the input selector to suit the type of the car stereo component to be connected.

If this amplifier is connected to a Pioneer car stereo component with DIN sockets, set the DIN gain control to the specified position (+). If the amplifier is connected to a Pioneer car stereo component with RCA pin jacks, set the RCA level control to the specified position (+). If the amplifier is connected to a non-Pioneer car stereo component with RCA pin jacks, adjust the input level as shown in Fig. A.

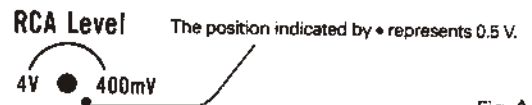
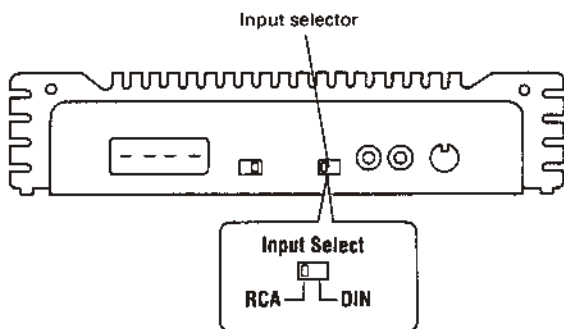


Fig. A

- Adjust control ● with the supplied adjustment screwdriver. Keep the screwdriver in case you need to readjust the controls later.

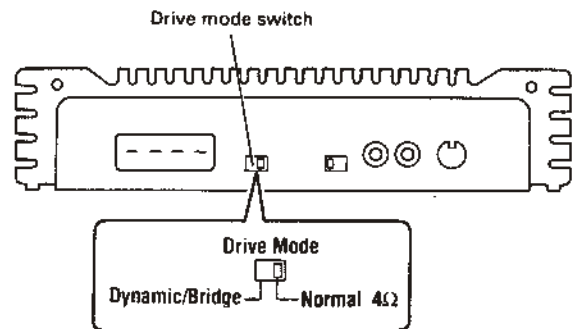
Input selector

Set the input selector to suit the car stereo component connected to the amplifier. To connect the amplifier to a car stereo component with RCA pin jacks, set the input selector to the left side (RCA position). To connect the amplifier to a Pioneer car stereo component with DIN sockets, set the input selector to the right side (DIN position).



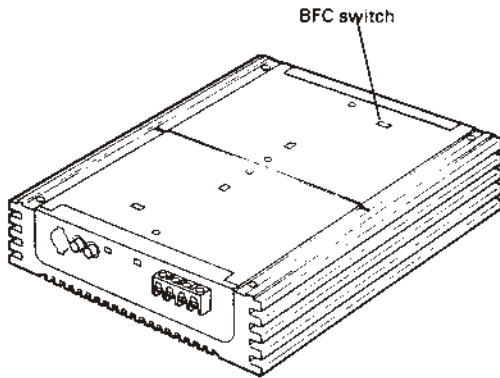
Drive mode switch

If the impedance of the speakers used with the amplifier is 4Ω or more, slide the drive mode switch on the rear of the amplifier to the right (Normal 4Ω). If one channel (mono) is used, or if the speaker impedance is 4Ω or less, slide the switch to the left (Dynamic/Bridge).



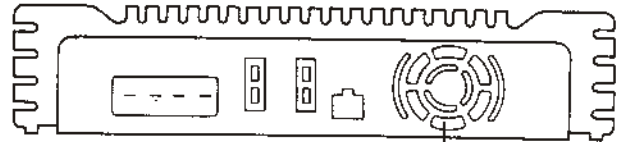
BFC (Beat Frequency Control) switch

If beating is heard when listening to AM stations on your car radio, change the position of the BFC switch on the bottom of the amplifier with a small flat-bladed screwdriver.

**Compulsory fan cooling system**

This is a high-power amplifier, so it produces a lot of heat. To keep it cool, it has fan cooling.

- When the power of the car stereo is turned on, the compulsory cooling fan of this power amplifier works automatically and cools inside of this amplifier.
- Install the amplifier so there is enough space front and back to allow the fan cooling to work properly. If the front or back side is covered, the amplifier may malfunction or fail.



5. CONNECTING THE UNITS (EW MODEL)

Connect the components as shown in the diagram.

- Before finalizing installation, turn everything on, and make sure everything works correctly and that no noise is getting into the system.
- When routing leads and cords, secure them with cable retainers and electrician's adhesive tape. Also, to prevent any damage to the insulation on the leads and cords, protect them with electrician's adhesive tape wherever they may touch sharp edges.
- Keep all wiring away from hot surfaces or heater outlets to prevent short circuits.
- It is recommended that the speakers connected to the amplifier have the ratings shown below, or higher. If a speaker has a rating below that recommended, it may be damaged when the volume is turned up. The speaker impedance must be 2 to 8 ohms.

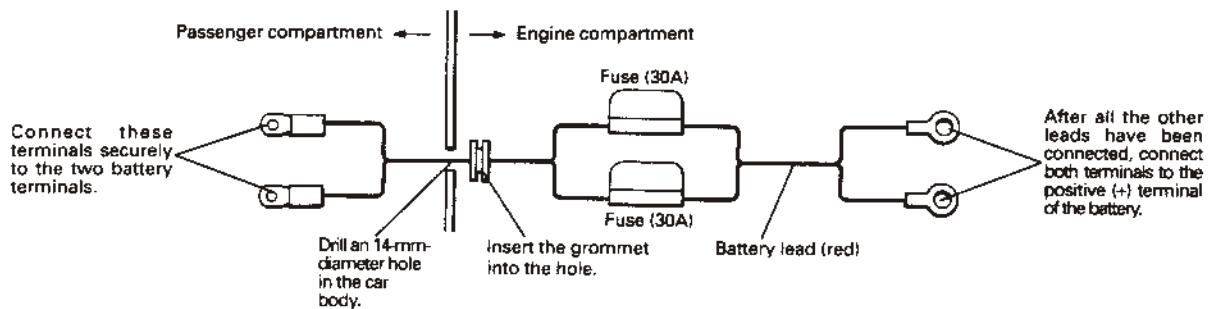
Mode	Speaker ratings	
	Two-channel	Maximum
Nominal		120 W
One-channel	Maximum	640 W
	Nominal	320 W

In the case of a full-range speaker, use one whose maximum rating is higher than the maximum rating shown. In the case of a sub-woofer, use one whose nominal rating is higher than the nominal rating shown.

- Never connect a speaker lead to ground or to other speaker grounds. The protection circuitry will operate instantaneously, turning off the amplifier.
- To prevent noise problems, keep the power leads to the amplifier away from the signal cords and speaker leads. Also, keep the power leads away from any antenna cords.
- Amplifier ground leads (black) should be connected to a solid metal part of the vehicle body. If using multiple amplifiers, connect all amplifier ground leads to the same point to prevent noise problems. To get good contact when grounding, you may have to sand away the paint to expose the metal underneath.
- To operate the amplifier and car stereo properly, connect the battery lead and the accessory power lead (red/black) correctly. If the leads are not connected correctly or are not connected at all, the amplifier and car stereo will not work.
- To connect the amplifier to the RCA pin jacks of a car stereo component, use an audio cord with RCA pin plugs. To connect the amplifier to the DIN socket of a car stereo component, use a DIN connection cord. Both kinds of cord are available from your dealer.

Connecting the battery lead (red)

Route the positive(+) battery lead (red) from the engine compartment to the passenger compartment before connecting it to the amplifier. To prevent a short circuit, only connect the lead after connecting all the other leads. Connect the two wires of the battery lead securely. If either of them comes loose because of vibration while the car is moving, a short circuit may occur and a fire may break out.

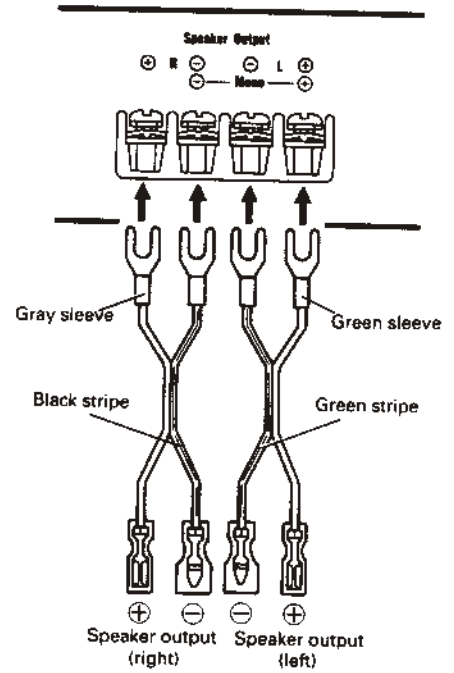


Connecting the leads (supplied)

Connecting the speaker leads

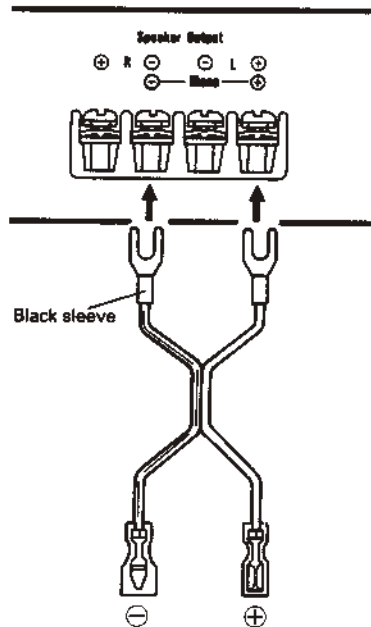
This amplifier can select two-channel output (stereo) or one-channel output (mono). The speaker leads must be connected to suit the mode selected. Connect the speaker leads to the output terminals of the amplifier, paying attention to the polarities (+ and -) and lead colors.

Two-channel mode (stereo)



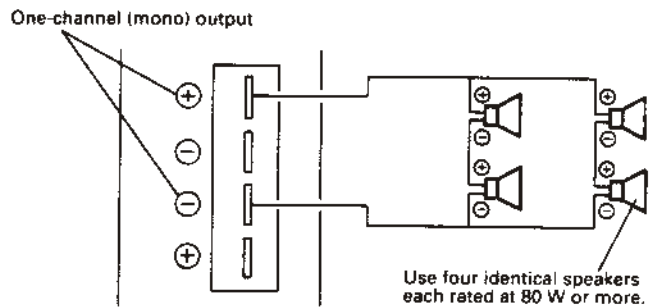
One-channel mode (mono)

- Slide the drive mode switch to the left (Dynamic/Bridge).



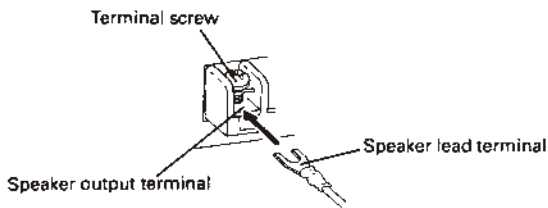
Speakers to be connected to the amplifier for one channel (mono)

If this amplifier is used for one channel (mono), its nominal output is 320 W (640 W max.). To handle this output, four identical speakers with nominal inputs of 80 W or more should be connected as shown below (making the total nominal inputs 320 W or more). The output volume will be greater than when only a single speaker is used.

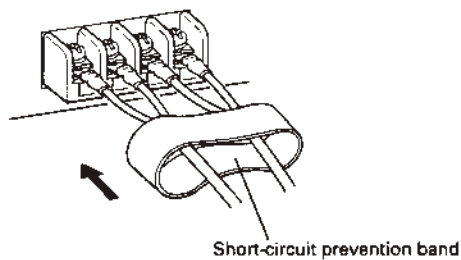


Speaker lead connection procedure

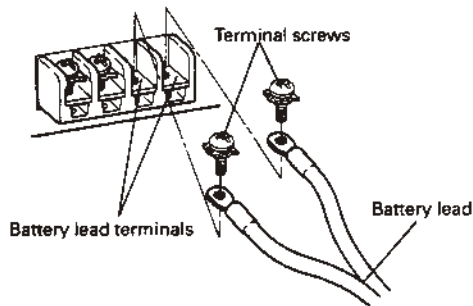
1. Loosen the four screws of the speaker terminals (Speaker Output) on the rear of the amplifier.
2. Insert the end of each speaker lead between the speaker terminal and its screw according to the mode to be used, and tighten the screw.



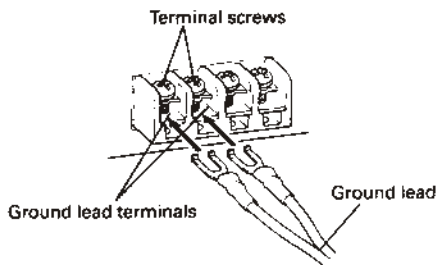
3. Cover each terminal block with a short-circuit prevention band.
 - This band *must* be used.



3. Connect the battery lead to the two battery lead terminals, reinserting and tightening the screws (x 2).

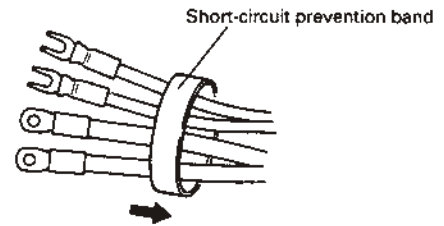


4. Connect the ground lead to the two ground lead terminals, tightening the screws.

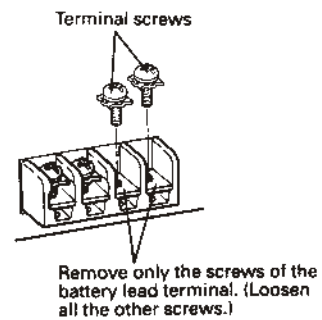


Connection of the battery power, and ground leads

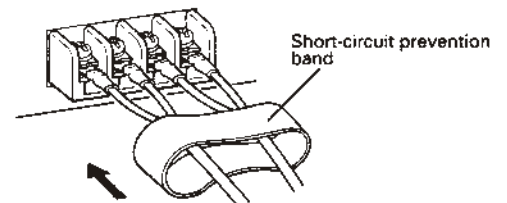
1. Pass the leads through the band for preventing short circuits.
 - This band *must* be used.



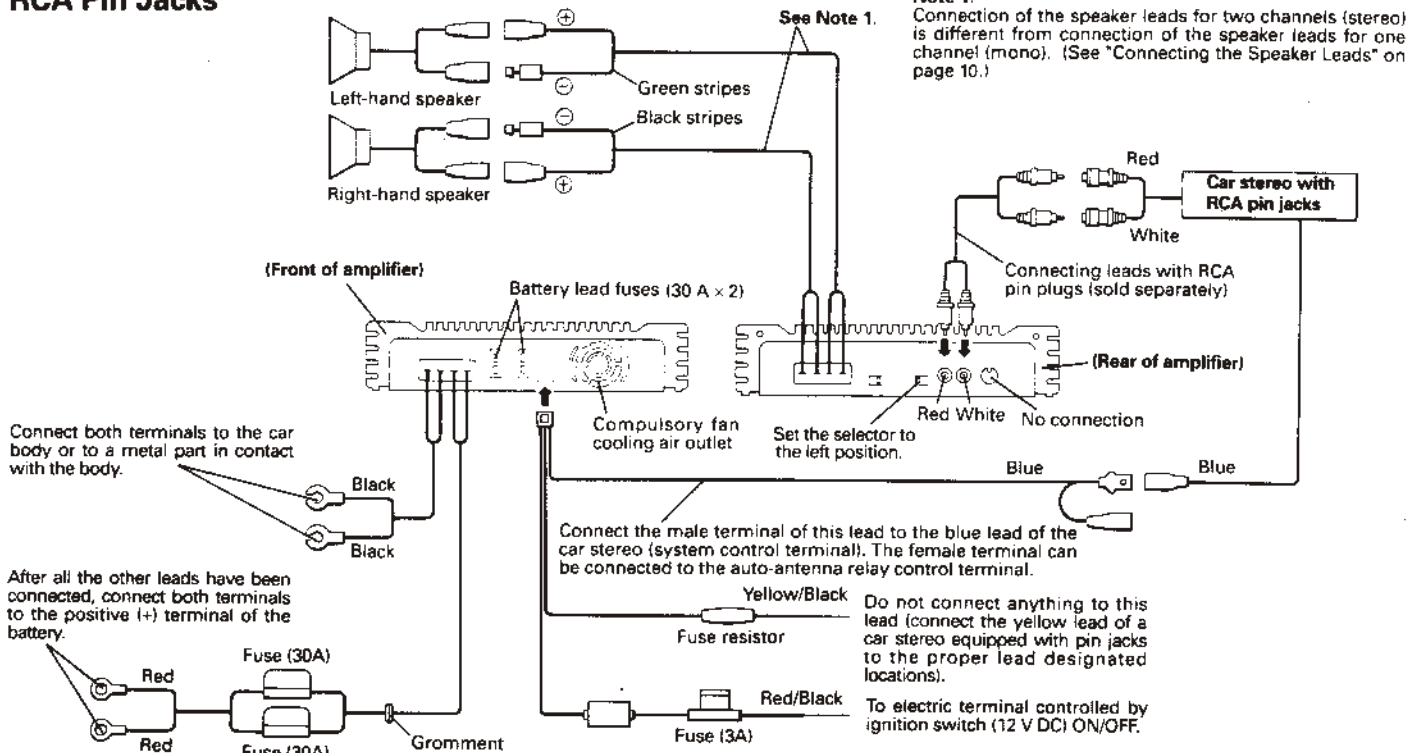
2. Loosen the screws (x 2) of the terminals on the front panel of the amplifier.
 - Remove the screws (x 2) from the two battery power terminals.



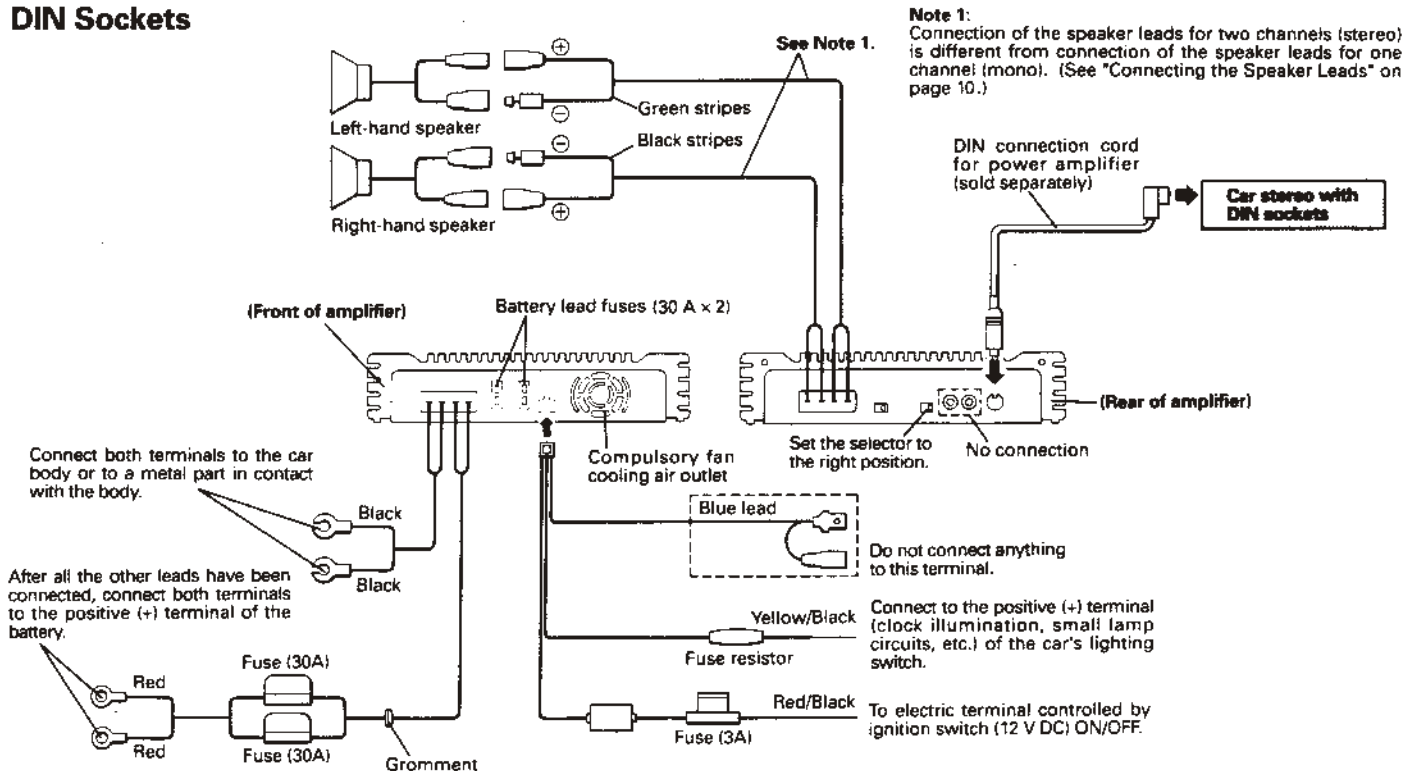
5. Slide the short-circuit prevention band over the terminals.



When Combined with a Car Stereo with RCA Pin Jacks



When Combined with a Car Stereo with DIN Sockets



6. DISASSEMBLY

● Remove the Case

1. Remove the four screws A and remove the two cases.

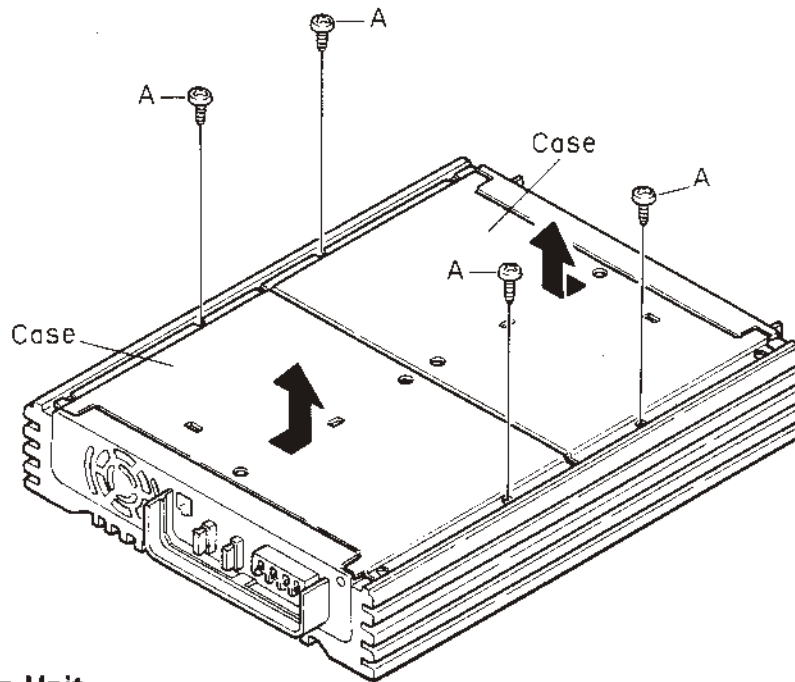


Fig. 1

● Remove the Amp Unit

1. Remove the two screws B and remove the front panel.
2. Remove the two screws C and remove the rear panel.
3. Remove the four screws D and thirteen screws E.
4. Remove the Amp Unit.

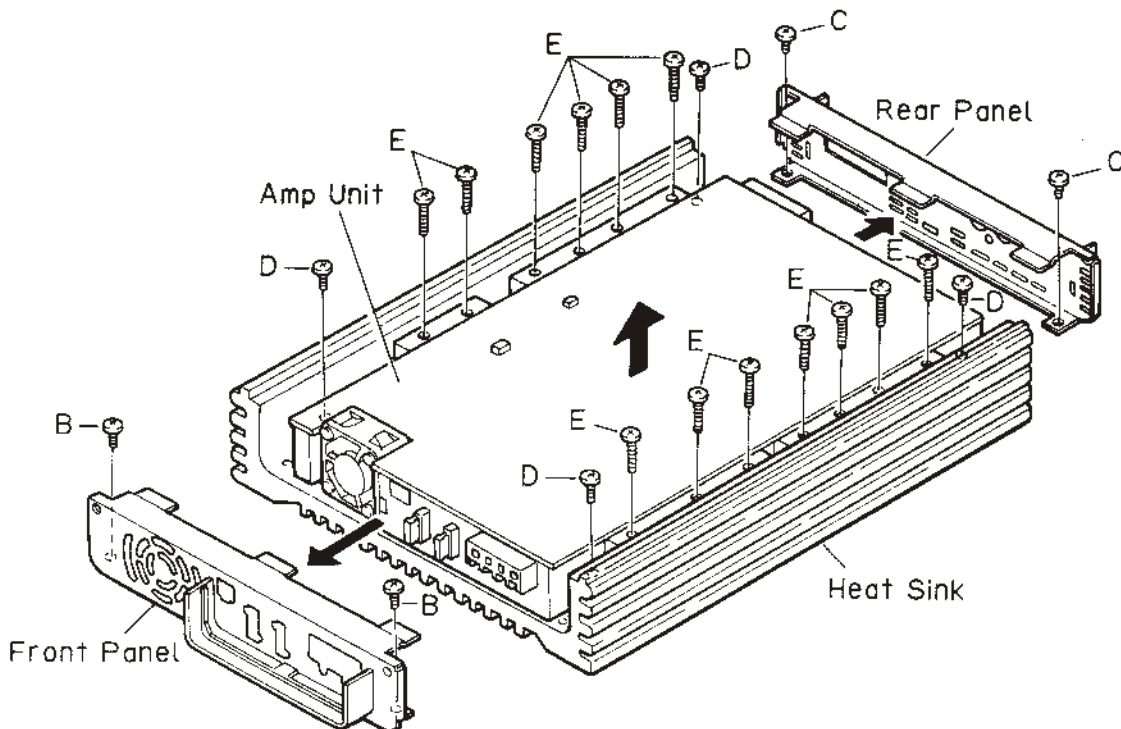


Fig. 2

● **Remove the Bracket**

1. Remove the screw F and remove the LED Assy.
2. Remove the three screws G and remove the bracket.

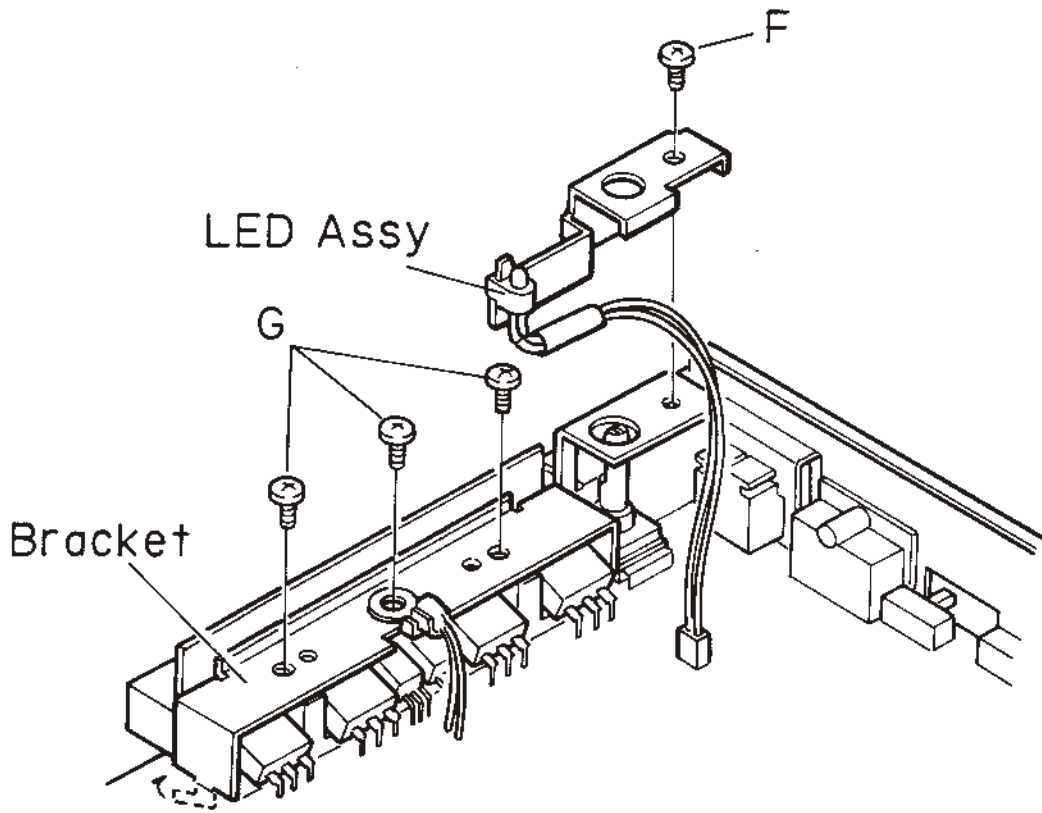


Fig. 3

Attention points for disassembling

- The screw of ground terminal cannot be removed. Don't loosen forcibly.
- After removing the amplifier unit, put the amplifier unit on the heat sink being faced down. When the amplifier unit on the audio circuit side (The side fixed by four screws) is fixed using the screw, the test at full power can be done for approx. 20 minutes.

7. CIRCUIT DESCRIPTION

- **Isolator circuit**

The differential amplification circuit, which is usually combined with the operational amplifier and the resistance network, is arranged to the dedicated IC. The ripple removal ratio is further improved than the conventional differential amplification circuit.

- **Non-switching circuit type III**

By adding Q429 to Q432, distortion removal capacity is improved.

- **PWM POWER SUPPLY (Voltage detection circuit for both positive and negative voltage.)**

The PWM power supply is a circuit that maintains stable secondary voltage in a DC-DC converter, regardless of the voltage fluctuation and load fluctuation of the primary voltage.

Former PWM power supply detected and controlled only positive voltage of DC-DC converter. New PWM power supply increases output in the lower range through detecting and controlling both positive and negative voltages and it creates a higher fidelity sound.

(Manufacture the current mirror using Q114 and Q115, and input $-V_H$ into the pin 16 of IC101 through Q116. $+V_H$ is input through Q117. R131 to R134 are the voltage dividers.)

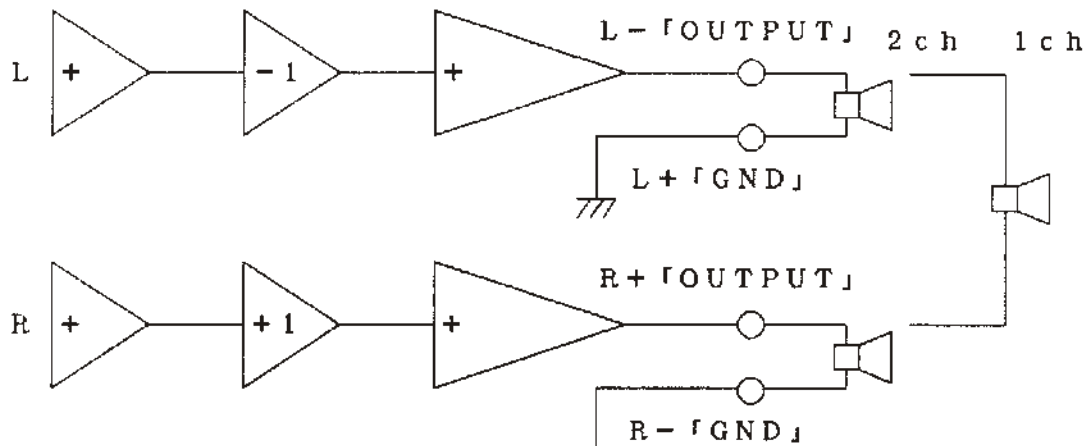
- **Troidal transformer and others**

To improve efficiency and to delete the leakage flux, the "doughnut" type transformer is adopted. And corresponding to current increment, two fuse, choke coil parallel combinations. (L101, L102)

- **DC servo**

To reduce the DC component appeared in the output, DC is fed back by means of IC201 and IC202. This circuit performs the low-pass feed back of less than 200Hz simultaneously.

- **In this unit, the mode selecting circuit was simplified in the following manners.**



① Always inverse phase

② The output side is indicated as (-). (For the speakers, left and right channels are of the same phase.)

Fig. 4

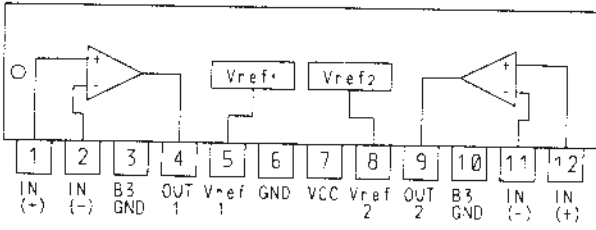
Figure shows the case of UC, EW carries out ① and ② on the right channel.

For the above two reasons, a signal selector switch was eliminated.

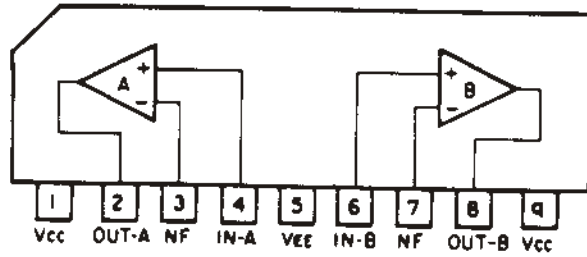
When you make a test, take care not to short-circuit (OUTPUT) and (GND). Especially when you measure two channels at the same time, a great care must be taken because short-circuit is susceptible to take place at the measuring instrument.

• ICs

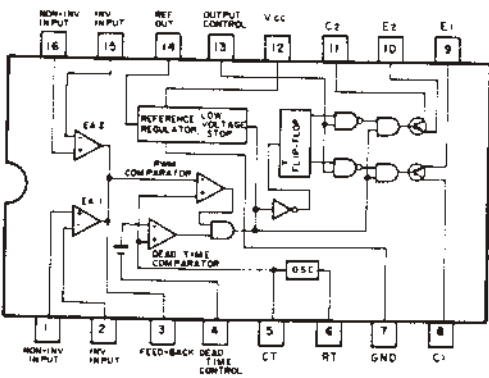
TA8181SN



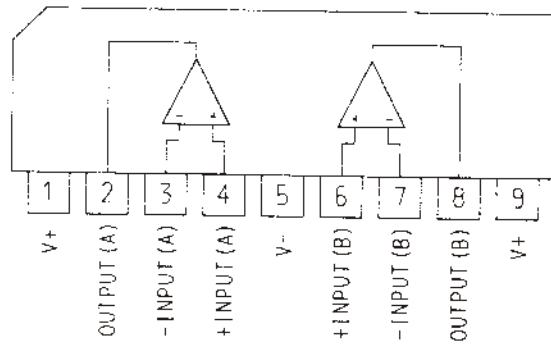
NJM2068S



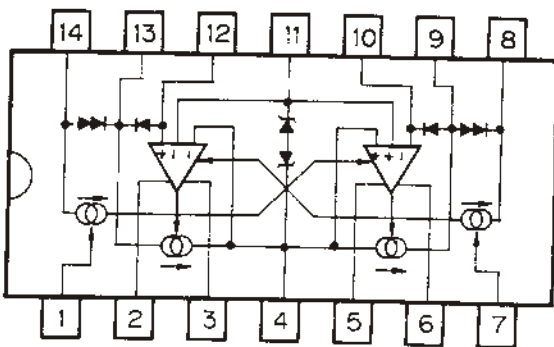
UPC494C



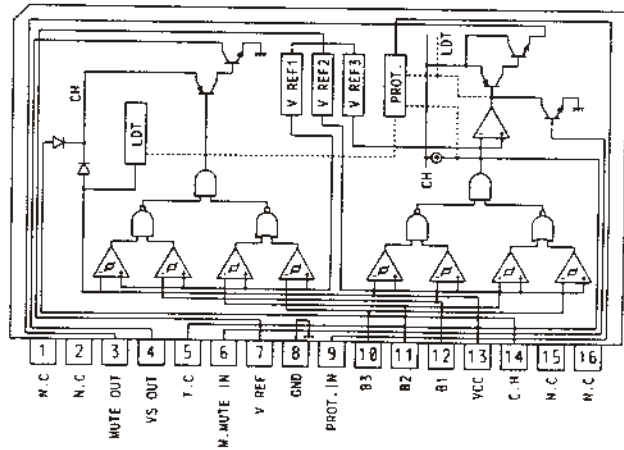
NJM5532S



PA0016

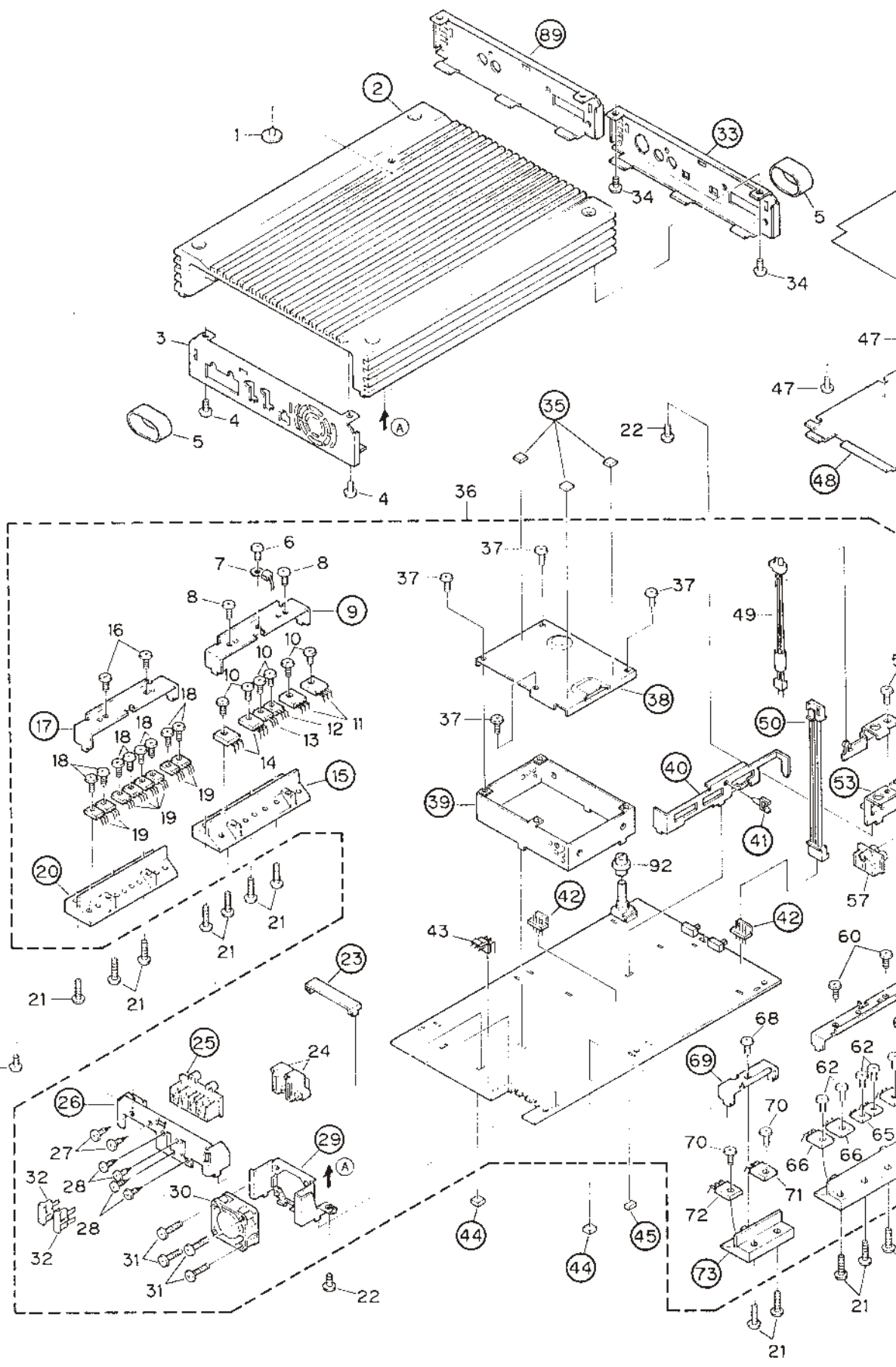


TA8194Z



12. EXPLODED VIEW

A
B
C
D



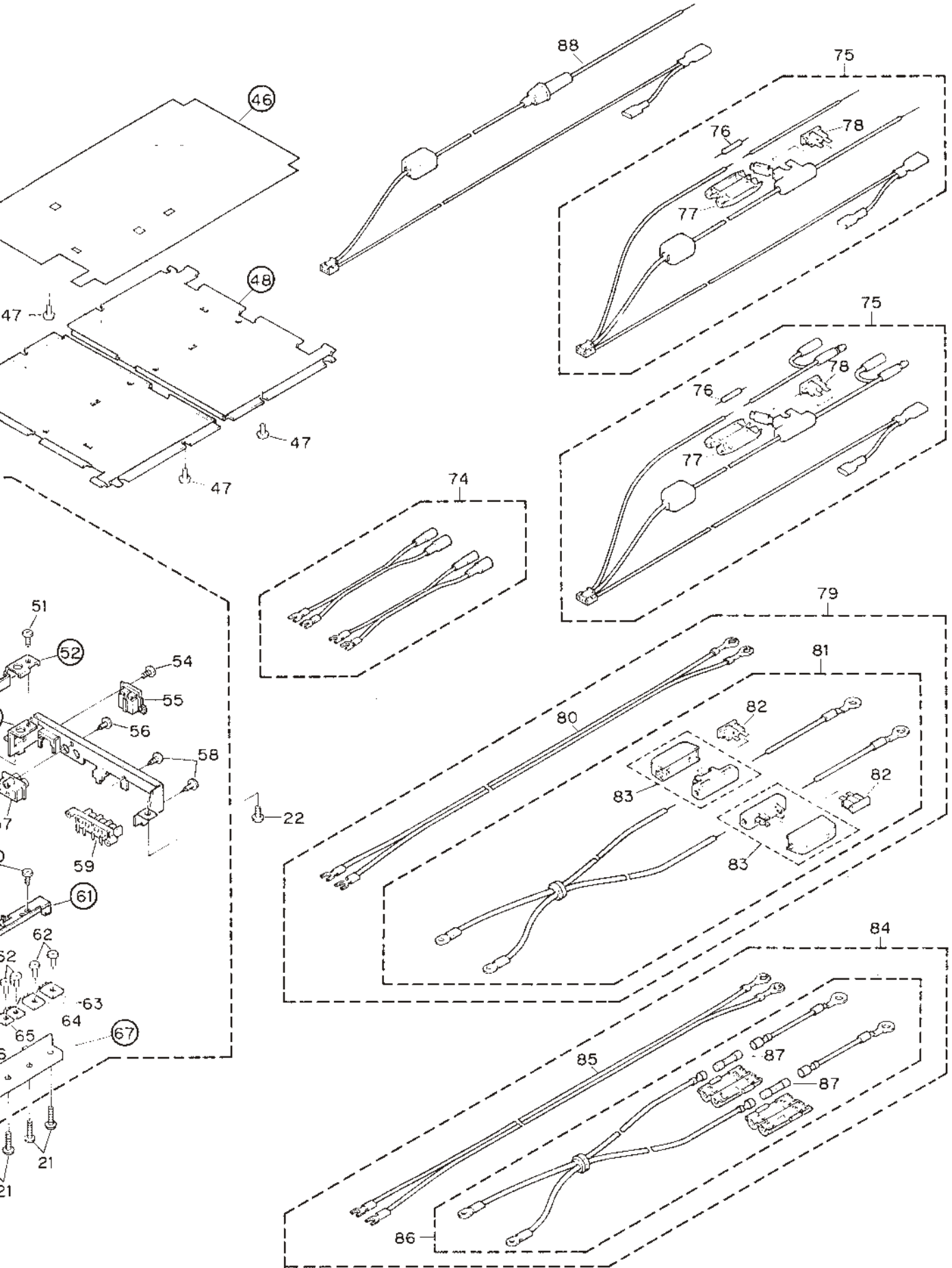


Fig. 9

● Parts List

NOTE:

- The parts marked with "●" may need long time to supply and their supply is subject to refuse as the case may be.
- Because the parts with encircled number shown on the dismantling drawing are not spare parts, we are unable to supply them in principle.

Mark No.	Description	Part No.	Mark No.	Description	Part No.
1	Lens	CNS2050	48	Case	CNB1470
2	Heat Sink (UC)	CNR1186	49	110 Assy	CXA21R3
	Heat Sink (EW)	CNR1205	50	Cord	CDE3276
3	Panel (UC)	CNB1421	51	Screw	BMZ30P050FMC
	Panel (EW)	CNB1462	52	Holder	CNC3539
4	Screw	BBZ30P050FMC	53	Bracket	CNC3538
5	Cover	CNS2211	54	Screw (EW)	BMZ20P080FMC
6	Screw	BMZ30P050FMC	55	Connector (EW)	CXS1156
7	Thermister	CXC1017	56	Screw	PPZ30P100FZK
8	Screw	BMZ30P050FMC	57	Jack	CXB1006
9	Bracket	CNC3540	58	Screw	PPZ30P100FZK
10	Screw	BMZ30P080FMC	59	Terminal	CKE1018
11	Transistor	2SA1673	60	Screw	BMZ30P050FMC
12	Transistor	2SA1306	61	Bracket	CNC3540
13	Transistor	2SC3298	62	Screw	BMZ30P080FMC
14	Transistor	2SC4388	63	Transistor	2SC4388
15	Heat Sink	CNR1207	64	Transistor	2SC3298
16	Screw	BMZ30P050FMC	65	Transistor	2SA1306
17	Bracket	CNC3540	66	Transistor	2SA1673
18	Screw	BMZ30P080FMC	67	Heat Sink	CNR1207
19	FET	2SK1191	68	Screw	BMZ30P050FMC
20	Heat Sink	CNR1208	69	Bracket	CNC3541
21	Screw	BBZ30P180FMC	70	Screw	BMZ30P080FMC
22	Screw	BBZ30P050FMC	71	Diode	FM6-32R
23	Terminal	CNC3641	72	Diode	1MG 32S
24	Auto Fuse Holder	CKR1004	73	Heat Sink	CNR1209
25	Terminal	CKE1020	74	Cord Assy	CDE3019
26	Bracket	CNC3537	75	Cord Assy (EW)	CDE3308
27	Screw	PPZ30P100FZK	76	Resistor (EW)	RS1/2P102JL
28	Screw	PPZ20P080FZK	77	Cap (EW)	CNS1472
29	Bracket	CNC3536	78	Fuse (EW)	CEK1134
30	Motor Fan	CKM1047	79	Cord Assy (EW)	CDE3297
31	Screw	BMZ30P250FMC	80	Cord (EW)	CDE3069
32	Fuse	CEK1140	81	Cord (EW)	CDE3299
33	Panel (EW)	CNB1473	82	Fuse (EW)	CEK1140
34	Screw	BBZ30P050FMC	83	Auto Fuse Holder (EW)	CKR1006
35	Spacer	CNM3142	84	Cord Assy (UC)	CDE3298
● 36	Amp Unit (UC)	CNM2782	85	Cord (UC)	CDE3069
	Amp Unit (EW)	CNM2781	86	Cord (UC)	CDE3068
37	Screw	BMZ30P050FMC	87	Fuse (UC)	CEK1117
38	Shield Case	CNC3540	88	Cord Assy (UC)	CDE3309
39	Shield Case	CNC3547	89	Panel (UC)	CNB1422
40	Holder	CNC3543	90, 91	
41	Clamper	CNV1343	92	Knob	CAA1275
42	Plug	CXS-557			
43	Plug	CXS1821			
44	Spacer	CNM3075			
45	Spacer	CNM3141			
46	Insulator	CNM3140			
47	Screw	BBZ30P060FMC			

13. PACKING METHOD

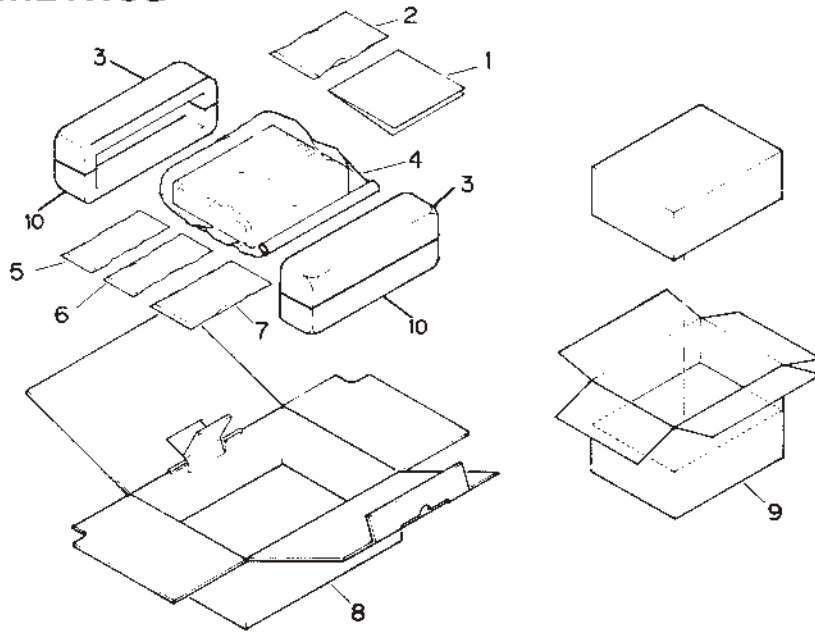


Fig. 10

● Parts List

NSP: Non Spare Part

Mark No.	Description	GM-H200/UC	GM-4200/EW
		Part No.	Part No.
1-1	Owner's Manual	CRD1457	CRD1455
	Owner's Manual	CRD1456
1-2	Card	NSP
	Card	NSP
2	Accessory Assy	CEA1654	CEA1654
2-1	Screw Assy	NSP	NSP
2-1-1	Screw (×4)	HYC50P65DFZK	HYC50P650FZK
2-2	Cover (×2)	CNS2211	CNS2211
2-3	Driver	CNV2697	CNV2697
3	Styrofoam	CHP1421	CHP1421
4	Cover	CEG1100	CEG1100
5	Cord Assy	CDE3309	CDE3308
6	Cord Assy	CDE3019	CDE3019
7	Cord Assy	CDE3298	CDE3297
7-1	Cord	CDE3069	CDE3069
7-2	Cord	CDE3068	CDE3299
8	Carton	CHG2003	CHG2002
9	Contain Box	CHL2003
10	Styrofoam	CHP1422	CHP1422

* Owner's Manual

Part No.	Model	Language
CRD1457	UC	English, French
CRD1455	EW	English, French, German, Spanish
CRD1456	EW	Swedish, Norwegian, Dutch, Italian, Finnish

14. ELECTRICAL PARTS LIST

NOTE:

- Parts whose parts numbers are omitted are subject to being not supplied.

● GM-H200/UC

Unit Number :
Unit Name : Amp Unit

MISCELLANEOUS

Mark	Circuit Symbol & No.	Part Name	Part No.
IC	1	TAB1815N	
IC	3	NJM7068S	
IC	101	UPC484C	
IC	201 202	NJM5532S	
IC	501 502	PA0016	
IC	601	TA81947	
Q	101 102 103 104 105 106 107 108	2SK1191	
Q	109 110	2SC3472	
Q	111 112	2SA1358	
Q	114 115 603	2SA1048	
Q	116 117 604 605	2SC2458	
Q	151 608	2SD2037	
Q	152	2SB1357	
Q	153	2SC3472	
Q	154	2SA1358	
Q	301 302	2SD1768S	
Q	303	2SB1278	
Q	401	2SK389	
Q	402	2SK388	
Q	405 406 407 408	2SC2603	
Q	409 410 411 412 413 414 415 416	2SC1845	
Q	417 418 421 422 427 428 429 430 503 504	2SA1145	
Q	419 420	2SA992	
Q	423 424 425 426 431 432 501 502	2SC2705	
Q	505 506	2SC3298	
Q	507 508	2SA1306	
Q	509 510 513 514	2SC4388	
Q	511 512 515 516	2SA1673	
Q	601	2SB1240	
Q	602	2SC3113	
Q	609 610	2SC2787	
Q	611	2SA1048	
D	1	H7S13J83	
D	101 102	RM47	
D	103 303 602	ERA15-02VH	
D	105	H23CP	
D	106 107	1SS133	
D	151	FMC-32S	
D	152	FMC-32R	
D	153 154	HZS16J81	
D	155 156	RD3R3ESB2	
D	301 302 405 406 407 408 409 410 411 412	1SS133	
D	401 402	RD7R3JS81	
D	403 404	HZS6B1L	
D	413 414 415 416 417 418 419 420 425 426	1SS133	

Mark ===== Circuit Symbol & No. ===== Part Name Part No.

D	421 422 423 424		RD8R2JS81
D	427 428 429 430 431 432 604		1SS133
D	507 502 503 504		1SS177
D	601		RD6R8JS82
D	603		HZS9R1J81
D	605		HZS12J82
D	606	LED Assy	CXA2183
L	1 2	Ferris-Inductor	CTF1007
L	101 102	Coil	CTH1086
L	104	Coil 100μH	CTF-113
L	151 152	Choke Coil	CTH1027
L	501 502	Coil	CTH1088
T	1	Transformer	CTT1014
RY	301	Relay	CSR1015
TH	301	Thermistor	CCX1012
M	601	Motor Fan	CXM1047
SW	3	Switch (BFC)	HSW-156
VR	1	Volume 5KΩ (A)	CCS1183
FU	1 2	Fuse 30A	CER1140
EF	151	EMI Filter	CCG1820

RESISTORS

Mark	Circuit Symbol & No.	Part Name	Part No.
R	1 2		RD1/4PS201JL
R	3 4		RD1/4PS682JL
R	5 6		RD1/4PS391JL
R	31 38		RD1/4PS102JL
R	33		RD1/4PS242JL
R	34		RD1/4PS152JL
R	36		RD1/4PS102JL
R	39 40		RD1/4PS471JL
R	41 42		RD1/4PS470JL
R	101 102 103 104		RS1/2P330JL
R	105 106 107 108 109 110 111 112 469 470		RD1/4PS680JL
R	113 114 127 128		RD1/4PS182JL
R	115 116		RD1/4PS332JL
R	117		RN1/4P1502D
R	118		RD1/4PS105JL
R	119		RD1/4PS102JL
R	120		RD1/4PS512JL
R	121 124 125 603 610		RD1/4PS472JL
R	122 445 446 447 448 465 466 467 468		RD1/4PS432JL
R	126 129		RD1/4PS153JL
R	130		RD1/4PS223JL
R	131		RD1/4PS184JL
R	132 403 404		RD1/4PS224JL

Mark	Circuit Symbol & No.	Part Name	Part No.	Mark	Circuit Symbol & No.	Part Name	Part No.				
R	133		RD1/4PS363JL	C	15 16		CKPYB102K50L				
R	134 231 232 409 410		RD1/4PS333JL	C	31 32		CFTNA104J50				
R	151 152		RD1/4PS822JL	C	33		CKPYB391K50L				
R	153 154		RD1/4PS182JL	C	34		CKPYB471K50L				
R	155 156 475 476 477 478		RD1/4PS332JL	C	35 36		CEA101M15L2				
R	201 202 203 204		RN1/4PC2202D	C	101 102 103 104	3900 μ F/16V	CCH1094				
R	205 205		RN1/4PC1002D	C	105 106		CGMA153J50				
R	207 208		RN1/4PC1002D	C	107		CPA102G2A				
R	209 216 235 236		RN1/4PC1802D	C	108		CEA2R2M50L2				
R	211 212 237 238		RN1/4PC1803D	C	109	470 μ F/16V	CCH-114				
R	233 234		RN1/4PC9101D	C	110	470 μ F/16V	CCH-114				
R	239 243		RD1/4PS471JL	C	111 112		CGMA104J50				
R	301 302 307 308		RD1/4PS104JL	C	113 601 603	470 μ F/16V	CCH-114				
R	303 304 433 434 435 436 607 608		RD1/4PS473JL	C	151 152	6800 μ F/63V	CCH1091				
R	305		RD1/4PS471JL	C	153 154	1000 μ F/63V	CCH1090				
R	306 613		RD1/4PS222JL	C	155 156 157 158		CEHA0470M50				
R	401 432 602		RD1/4PS221JL	C	159 160		CEA101M16L2				
R	405 405 407 408		RD1/4PS682JL	C	211 212 219 220		CGPAH473G2A				
R	411 412 437 438 439 440		RD1/4PS181JL	C	213 214		CEA100M16NPLL				
R	413 414 423 424 425 426		RD1/4PS332JL	C	215 216 405 406 411 412		CGMA103J50				
R	415 416		RD1/4PS681JL	C	217 218		CCCH390J50				
R	417 418 419 420 429 430 431 432 605		RD1/4PS331JL	C	301 302 517 518		CGMA102J50				
R	421 422 521 522 533 534 535 536 537 538		RD1/4PS470JL	C	401 402		CKPYB221K50L				
R	427 428		RD1/4PS122JL	C	403 404		CGMA122J50				
R	441 442 443 444 501 502 503 504 513 514		RD1/4PS101JL	C	407 408		CEA271M50L2				
R	449 450 451 452 485 486 487 488		RD1/4PS562JL	C	409 410		CGMA561J50				
R	453 454 455 456		RD1/4PS152JL	C	413 414 415 416		CGMA121J2H				
R	457 458 459 460		RD1/4PS821JL	C	417 418 419 420		CGMA102J50				
R	461 462 463 464		RD1/4PS820JL	C	421 422 423 424		CCPSL680J50L				
R	471 472		RD1/4PS680JL	C	425 426		CCPSL470J50L				
R	505 506 507 508 517 518 519 520 504 617		RD1/4PS103JL	C	427 428 429 430		CEA101M25L2				
R	509 510		RD1/4PS561JL	C	431 432 433 434 519 520 521 522		CFTNA104J50				
R	515 516		RD1/4PS101JL	C	501 502 503 504		CMA470J2H				
R	523 524		RD1/4PS560JL	C	505 506 507 508		CMA101J2H				
R	525 526 527 528 529 530 531 532		RD1/4PS477JL	C	509 510 511 512		CGMA104J50				
R	539 540		RD1/4PS470JL	C	513 514 515 516	1000 μ F/40V	CCH1096				
R	541 542 543 544 0.33 Ω × 2		CCM1041	C	602		CEA220M16L2				
R	545 546		RS2P101JL	C	604	220 μ F/10V	CCH1036				
R	547 548		RS2P100JL	C	605		CEA101M16L2				
R	601 619		RD1/4PS751JL	C	606		CEA4R7M50L2				
R	606		RD1/4PS123JL	● GM-4200/EW Unit Number : Unit Name : Amp Unit							
R	609		RD1/4PS104JL								
R	611		RD1/4PS822JL								
R	612		RS1/2PS61JL								
R	620		RD1/4PS473JL								
R	621 622		RD1/4PS102JL								
R	623		RD1/4PS182JL	MISCELLANEOUS Mark ===== Circuit Symbol & No. ===== Part Name Part No.							
R	625		RD1/4PS331JL								
C	1 2		CEA3R3M50L2					IC	1		TAB161SN
C	3 4		CEA470M16L2					IC	2 3		NJM206BS
C	5 6 11 12		CEA330M16L2					IC	101		UPC494C
C	7		CEA470M16L2					IC	201 202		NJM5532S
C	13 14		CGMA103J50	IC	501 502		PAD016				
C	15 16			IC	601		TAB194Z				
C	101 102 103 104 105 106 107 108			Q	101 102 103 104 105 106 107 108		ZSK1191				
C	109 110			Q	109 110		ZSC342Z				
C	111 112			Q	111 112		ZSA1355				
C	113 116 117 604 605 606			Q	113 116 117 604 605 606		ZSC2458				

CAPACITORS

Mark	Circuit Symbol & No.	Part Name	Part No.
C	1 2		CEA3R3M50L2
C	3 4		CEA470M16L2
C	5 6 11 12		CEA330M16L2
C	7		CEA470M16L2
C	13 14		CGMA103J50

● GM-4200/EW

Unit Number :
Unit Name : Amp Unit

MISCELLANEOUS

Mark	Circuit Symbol & No.	Part Name	Part No.
IC	1		TAB161SN
IC	2 3		NJM206BS
IC	101		UPC494C
IC	201 202		NJM5532S
IC	501 502		PAD016
IC	601		TAB194Z
Q	101 102 103 104 105 106 107 108		ZSK1191
Q	109 110		ZSC342Z
Q	111 112		ZSA1355
Q	113 116 117 604 605 606		ZSC2458

Mark	====	Circuit Symbol & No.	====	Part Name	Part No.						
Q	114	115	113	607	2SA1348						
Q	151	608			2SD2337						
Q	152				2SB1357						
Q	153				2SC3422						
Q	154				2SA1359						
Q	301	302			2SD17685						
Q	303				2SB1278						
Q	401				2SA389						
Q	402				2SK389						
Q	405	406	407	408	2SC2602						
Q	409	410	411	412	413	414	415	416	2SC1845		
Q	417	418	421	422	427	428	429	430	503	504	2SA1145
Q	419	420									2SA997
Q	423	424	425	426	431	432	501	502			2SC2705
Q	505	506									2SC3298
Q	507	508									2SA1366
Q	509	510	513	514							2SC4388
Q	511	512	515	516							2SA1673
Q	601										2SB1240
Q	602										2SC3113
Q	609	610									2SC2787
Q	611										2SA1048
D	1										HZS13JB3
D	101	102									RM47
D	103	303	602								EHA15-02VH
D	105										HZ3DP
D	106	107									1SS133
D	151										FMG-32S
D	152										FMG-32R
D	153	154									HZS16JB1
D	155	156									RD3R3ESB2
D	301	302	405	406	407	408	409	410	411	412	1SS133
D	401	402									RD7RSJSB1
D	403	404									HZS6B1L
D	413	414	415	416	417	418	419	420	425	426	1SS133
D	421	422	423	424							RD8R2JSB1
D	427	428	429	430	431	432	604				1SS133
D	501	502	503	504							1SS177
D	601										RD6R8JSB2
D	603										HZS9R7JB1
D	605										HZS12JB2
D	606										CXA2183
L	1	2									CTF1007
L	101	102									CTH1086
L	104										CTF-113
L	151	152									CTH1027
L	501	502									CTH1088
T											CTT1014
RY	301										CSR1015
Rn	301										CCX1012
M	601										CXM1047
SW	1										CSH1021
SW	2										CSH1025
SW	3										HSN-156
VR	1										CCS1183
FU	1	2									CEK1140
EF	151										CCG1020

RES STORE

Mark	====	Circuit Symbol & No.	====	Part Name	Part No.						
R		2			RD1/4PS472JL						
R	3	4			RD1/4PS382JL						
R	5	6			RD1/4PS391JL						
R	21	22			RD1/4PS471JL						
R	23	24			RD1/4PS223JL						
R	25	26	27	28	RD1/4PS102JL						
R	32				RD1/4PS102JL						
R	33				RD1/4PS152JL						
R	34				RD1/4PS242JL						
R	35				RD1/4PS102JL						
R	37				RD1/4PS102JL						
R	39	40			RD1/4PS471JL						
R	41	42			RD1/4PS470JL						
R	101	102	103	104	RS1/2P333JL						
R	105	106	107	108	109	110	111	112	469	470	RD1/4PS680JL
R	113	114	127	128							RD1/4PS182JL
R	115	116									RD1/4PS332JL
R	117										RN1/4PC1502D
R	118										RD1/4PS105JL
R	119	153	154	615							RD1/4PS192JL
R	120										RD1/4PS512JL
R	121	124	125	603	610						RD1/4PS472JL
R	122	445	446	447	448	465	466	467	468		RD1/4PS432JL
R	123										RD1/4PS102JL
R	126	129									RD1/4PS153JL
R	130	614									RD1/4PS223JL
R	131										RD1/4PS184JL
R	132	403	404								RD1/4PS224JL
R	133										RD1/4PS363JL
R	134	231	232	409	410						RD1/4PS333JL
R	135	505	506	507	508	517	518	519	520	604	RD1/4PS103JL
R	151	152	611								RD1/4PS822JL
R	155	156	475	476	477	478					RD1/4PS392JL
R	201	202	203	204							RN1/4PC2202D
R	205	206	207	208							RN1/4PC1002D
R	209	210	235	236							RN1/4PC1802D
R	211	212	237	238							RN1/4PC1803D
R	233	234									RN1/4PC9101D
R	239	240									RD1/4PS471JL
R	301	302	307	308	609						RD1/4PS104JL
R	303	304	433	434	435	436	607	608			RD1/4PS473JL
R	305										RD1/4PS471JL
R	306	613									RD1/4PS222JL
R	401	402	692								RD1/4PS221JL
R	405	406	407	408							RD1/4PS682JL
R	411	412	437	438	439	440					RD1/4PS181JL
R	413	414	423	424	425	426					RD1/4PS332JL
R	415	416									RD1/4PS661JL
R	417	418	419	420	429	430	431	432	605		RD1/4PS331JL
R	421	422	521	522	533	534	535	536	537	538	RD1/4PS470JL
R	427	428									RD1/4PS122JL
R	441	442	443	444	501	502	503	504	513	514	RD1/4PS101JL
R	449	450	451	452	485	486	487	488			RD1/4PS562JL
R	453	454	455	456							RD1/4PS152JL

Mark	====	Circuit Symbol & No.	====	Part Name	Part No.	Mark	====	Circuit Symbol & No.	====	Part Name	Part No.
R	457	458 459 460			RD1/4PS821JL	C	413	414 415 416			CMA121J2H
R	461	462 463 464			RD1/4PS820JL	C	417	418 419 420			COMA102J50
R	471	472			RD1/4PS680JL	C	421	422 423 424			CCPSL680J50L
R	509	510			RD1/4PS561JL	C	425	426			CCPSL470J50L
R	515	516			RD1/4PS101JL	C	427	428 429 430			CEA101M25L2
R	523	524			RD1/4PS560JL	C	431	432 433 434 519 520 521 522			CFTMA104J50
R	525	526 527 528 529 530 531 532			RD1/4PS4R7JL	C	507	502 503 504			CMA470J2H
R	539	540			RD1/4PS470JL	C	505	506 507 508			CMA101J2H
R	541	542 543 544 0.33Ω × 2			CCN1041	C	509	510 511 512			COMA104J50
R	545	546			RS2P101JL	C	513	514 515 516 1000 μ F/40V			CCH1096
R	547	548			RS2P100JL	C	602				CEA220M16L2
R	601	619			RD1/4PS751JL	C	604	220 μ F/10V			CCH1036
R	606				RD1/4PS123JL	C	605				CEA101M16L2
R	612				RS1/2P561JL	C	606				CEA4R7M50L2
R	616	617			RD1/4PS103JL						
R	620				RD1/4PS473JL						
R	621	622			RD1/4PS102JL						
R	623	624			RD1/4PS182JL						
R	625				RD1/4PS331JL						

CAPACITORS

Mark	====	Circuit Symbol & No.	====	Part Name	Part No.
C	1	2			CEA3R3M50L2
C	3	4			CEA470M16L2
C	5	6 11 12			CEA330M16L2
C	7				CEA470M16L2
C	13	14			COMA103J50
C	15	16 401 402			CKPYB221K50L
C	21	22			COMA104J50
C	23	24 34			CKPYB391K50L
C	25	26			CKPYB101K50L
C	27	28			CKPYV103M16L
C	31	32			CFTNA104J50
C	33				CKPYB471K50L
C	35	36			CEA101M10L2
C	101	102 103 104 3900 μ F/16V			CCH1094
C	105	106			COMA153J50
C	107				COPA10202A
C	108				CEA2R2M50L2
C	109	470 μ F/16V			CCH-114
C	110	470 μ F/16V			CCH-114
C	111	112			COMA104J50
C	113	601 603 470 μ F/16V			CCH-114
C	115	116 117 118 607 608			CKCYF473Z50
C	151	152 5800 μ F/63V			CCH1091
C	153	154 1000 μ F/63V			CCH1090
C	155	156 157 158			CEA40470M50
C	159	160			CEA101M16L2
C	211	212 219 220			COPAN47302A
C	213	214			CEA100M16NPLL
C	215	216 405 406 411 412			COMA103J50
C	217	218			CCCCN390J50
C	301	302 517 518			COMA102J50
C	403	404			COMA122J50
C	407	408			CEA221M50L2
C	409	410			COMA561J50

8. CONNECTION DIAGRAM (GM-H200/UC)

AMP UNIT

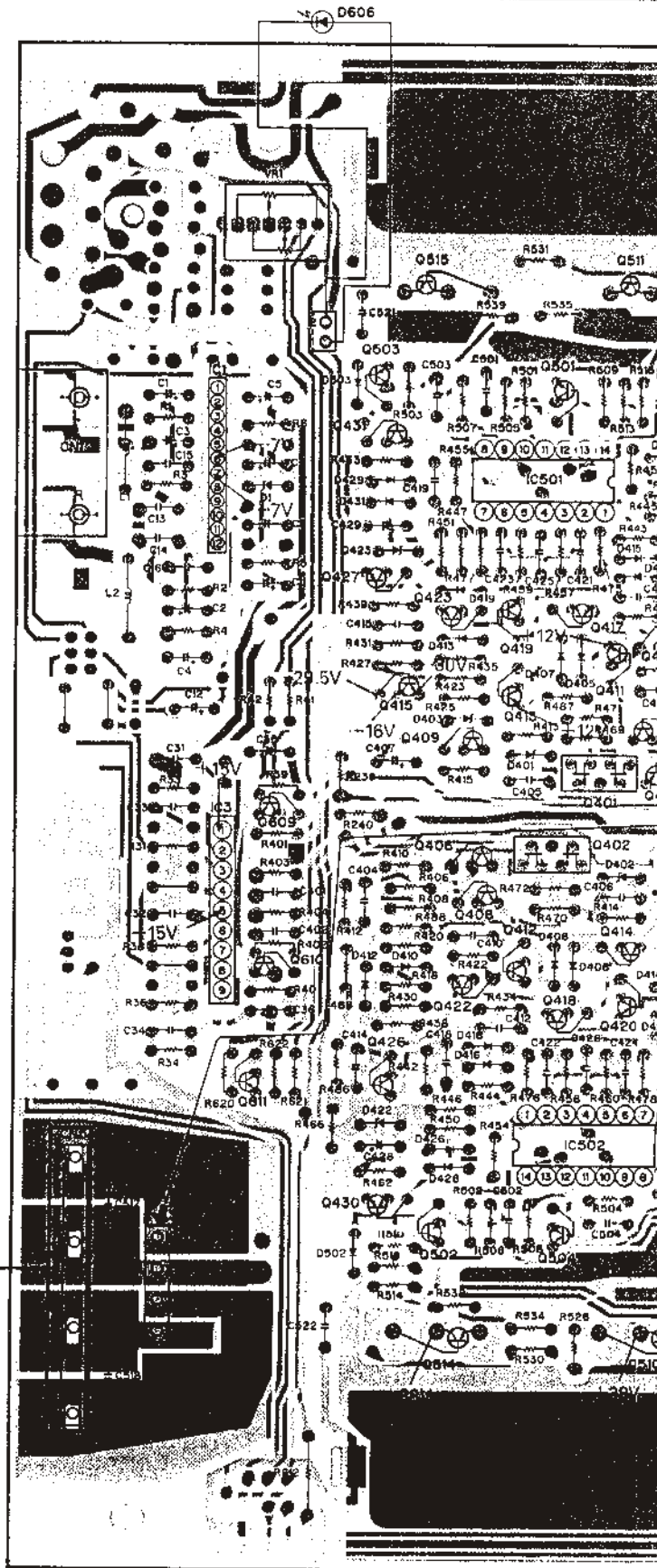
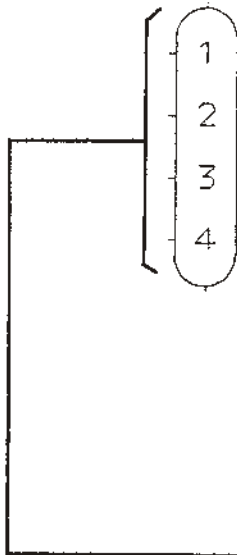
IC. Q	Q609	Q503	Q431	Q422	Q409	IC501	Q417	Q411	Q42		
IC. Q	IC1	IC3	Q611	Q610	Q430	Q415	Q514	Q408	Q419	Q418	Q42C

A

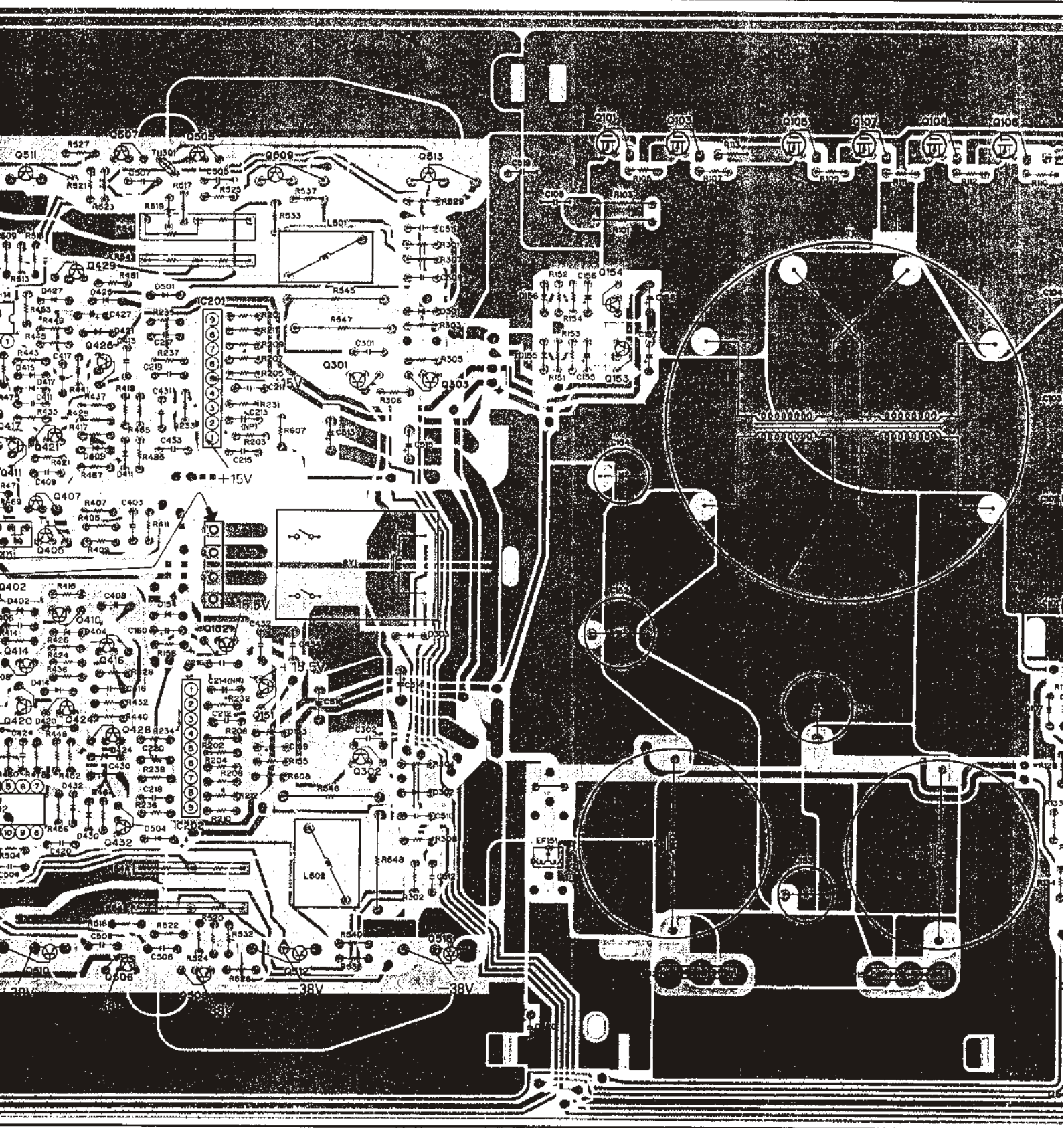
B

C

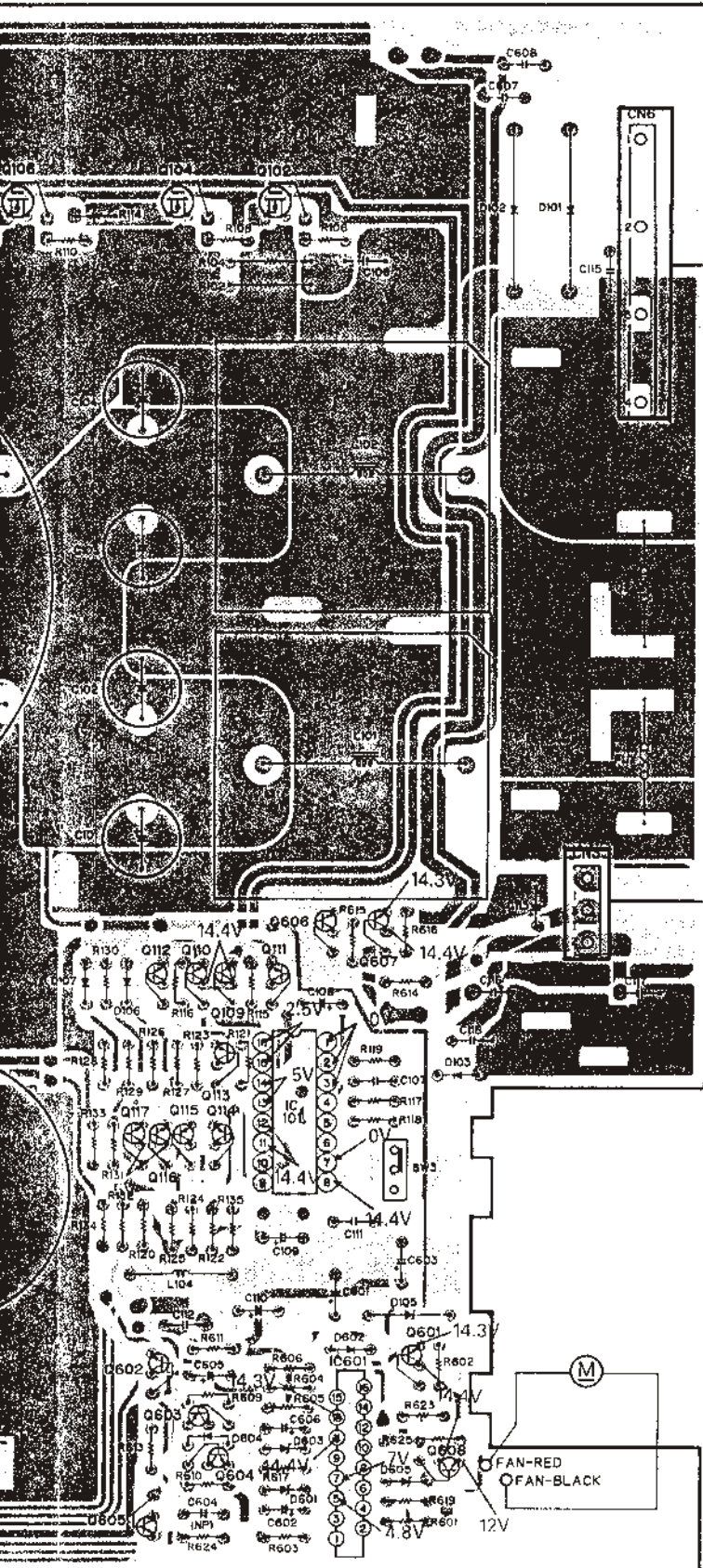
D



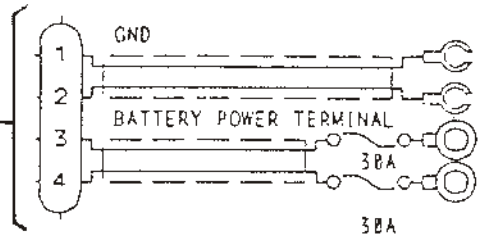
411 Q421 Q511
 501 Q424 Q429 Q416
 401 Q510 Q407 Q428 Q505
 04 Q414 Q405 Q432 Q507 IC201 Q152 Q509 Q513
 18 Q420 Q410 Q425 Q506 IC202 Q508 Q151 Q512 Q301 Q302 Q516 Q303 Q101 Q154 Q103 Q105 Q107 Q108 Q106



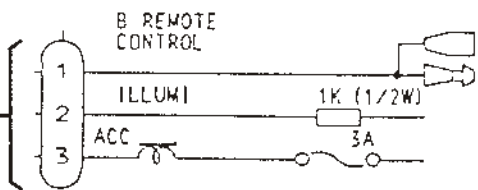
Q104 Q102 Q111
 Q109 Q113 Q114 Q109
 Q117 Q116 Q112 Q110 Q603 Q606 Q607
 Q106 Q605 Q602 Q115 Q604 IC101 IC601 Q601 Q608



A



B



C

D

Fig. 8

11. CONNECTION DIAGRAM (GM-4200/EW)

AMP UNIT

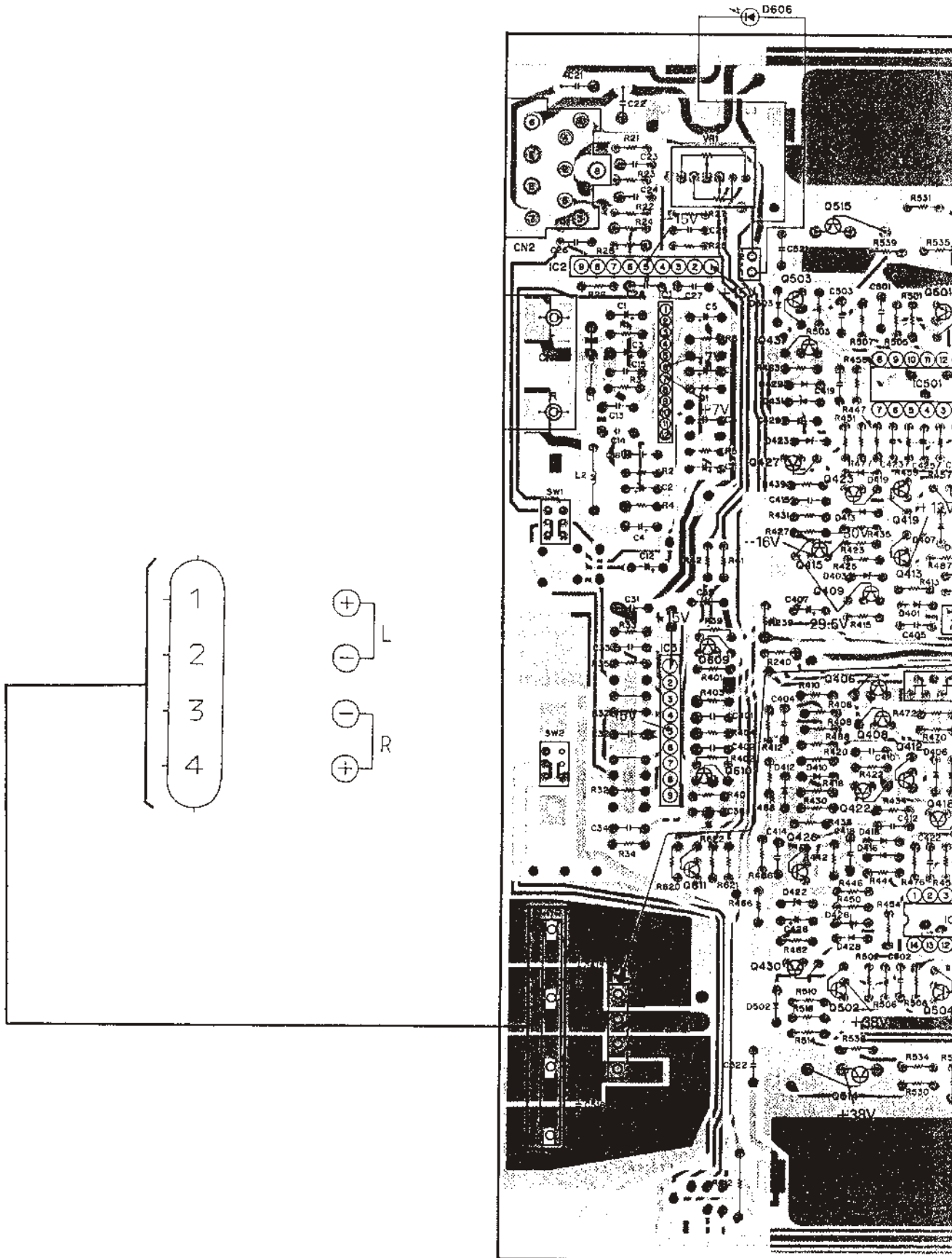
IC, Q	IC2	IC1	IC3	Q609	Q611	Q610	Q515	Q423	Q413	Q417	Q402
				Q503	Q431	Q422	Q409	Q502	Q406	Q412	IC502
				Q430	Q415	Q514	Q408	Q419			

A

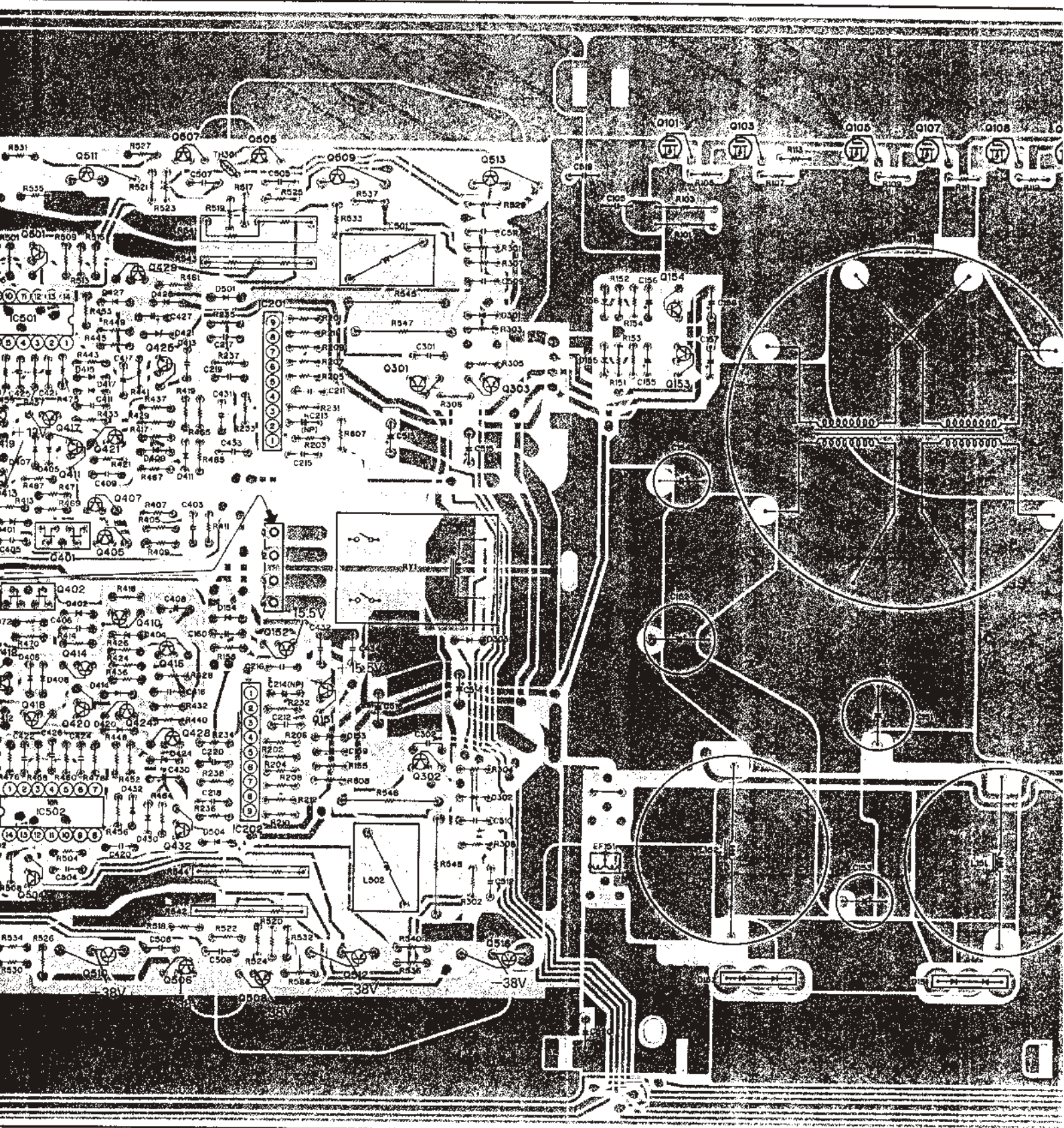
B

C

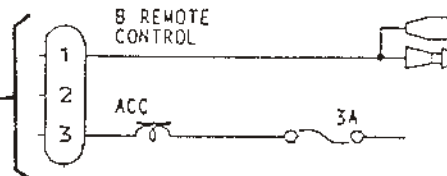
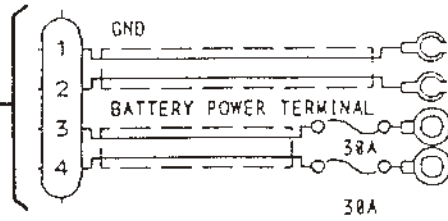
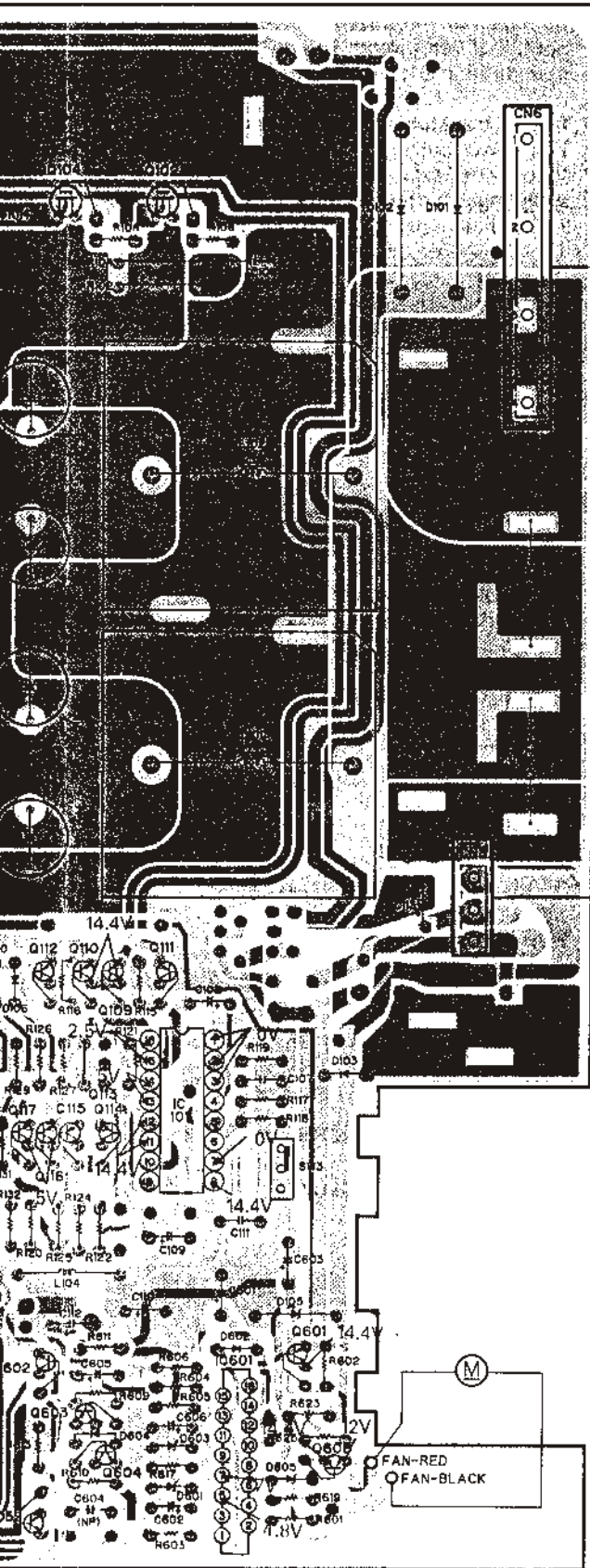
D



1 Q417 Q411 Q421 Q511
 3 Q402 Q501 Q424 Q429 Q416
 9 IC502 Q401 Q510 Q407 Q428
 5 Q412 Q504 Q414 Q405 Q432 Q507 IC201 Q152 Q509 Q513
 8 Q419 Q418 Q420 Q410 Q425 Q506 IC202 Q508 Q151 Q512 Q301 Q302 Q516 Q303 Q153 Q154 Q103 Q105 Q107 Q108



Q104 Q102 Q111
 Q117 Q116 Q112 Q110 Q603
 Q605 Q602 Q115 Q604 IC101 IC601 Q601 Q608



A

B

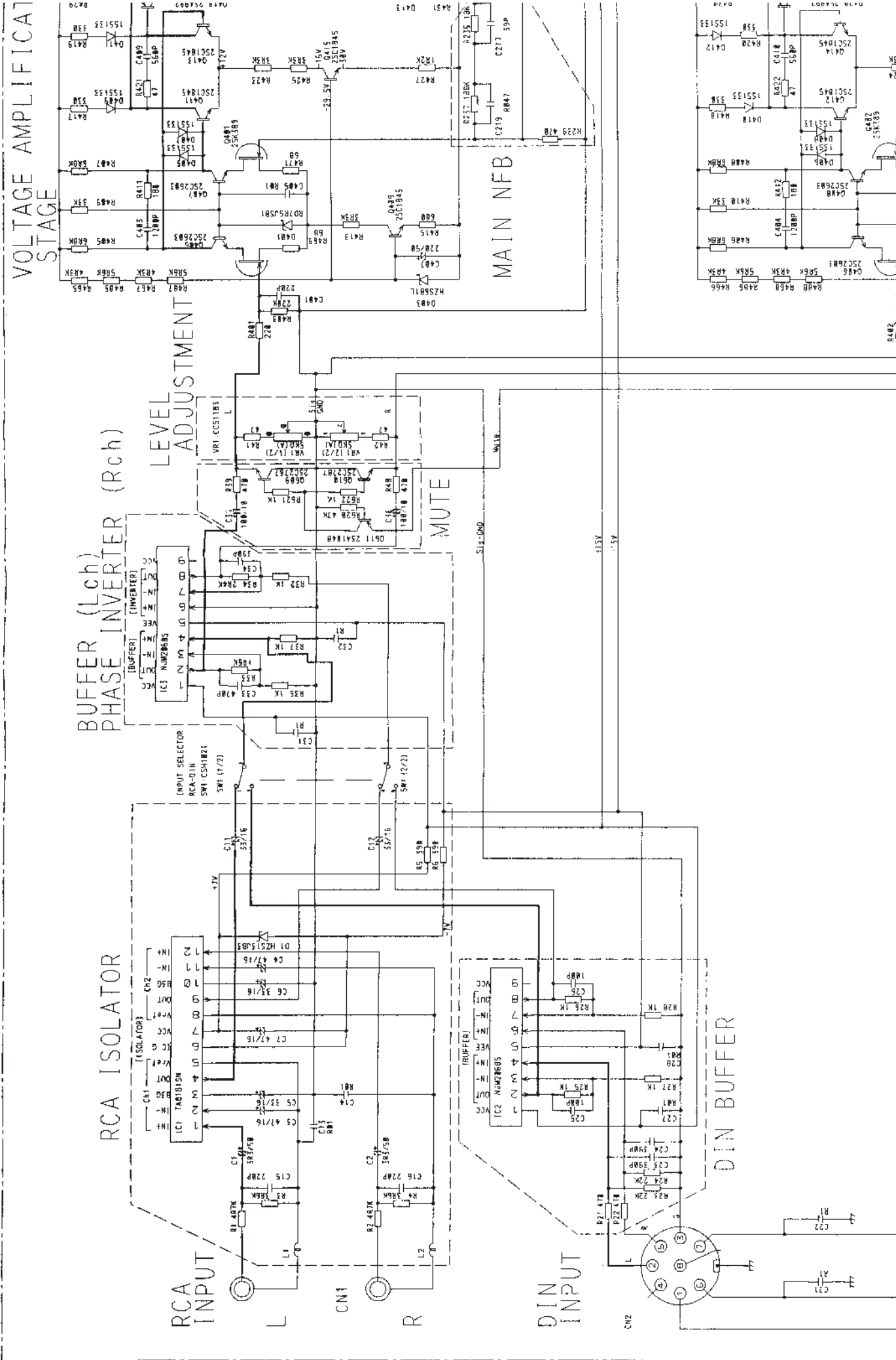
C

D

Fig. 5

10. SCHEMATIC CIRCUIT DIAGRAM (GM-4200/EW)

AMP UNIT



VOLTAGE AMPLIFICATION STAGE

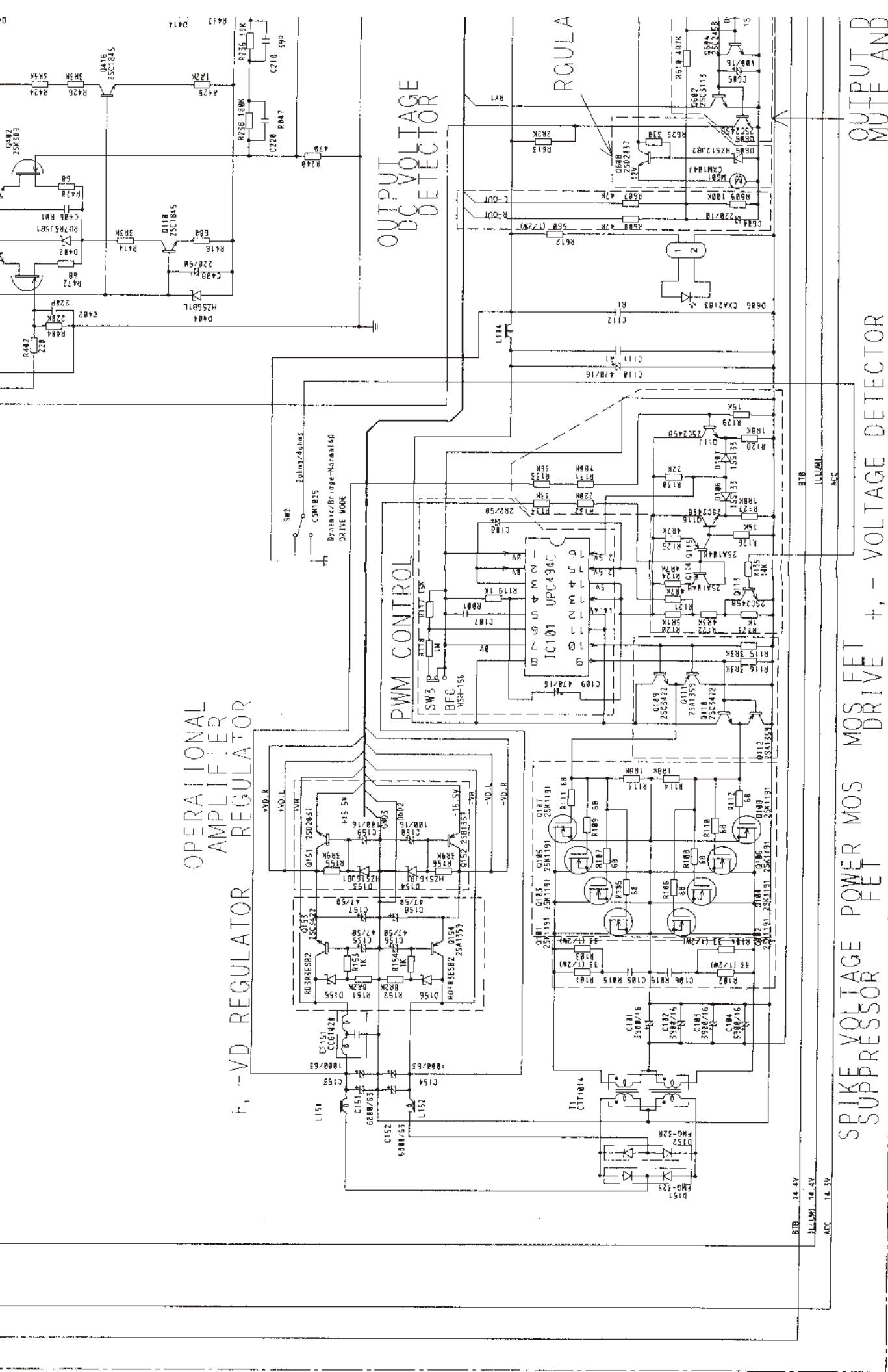
BUFFER (Lch) PHASE INVERTER (Rch)

LEVEL ADJUSTMENT

MUTE

MAIN NFB

DIN BUFFER



OPERATIONAL
AMPLIFIER
REGULATOR

F, -VD REGULATOR

PWM CONTROL

OUTPUT VOLTAGE
DC VOLTAGE
DETECTOR

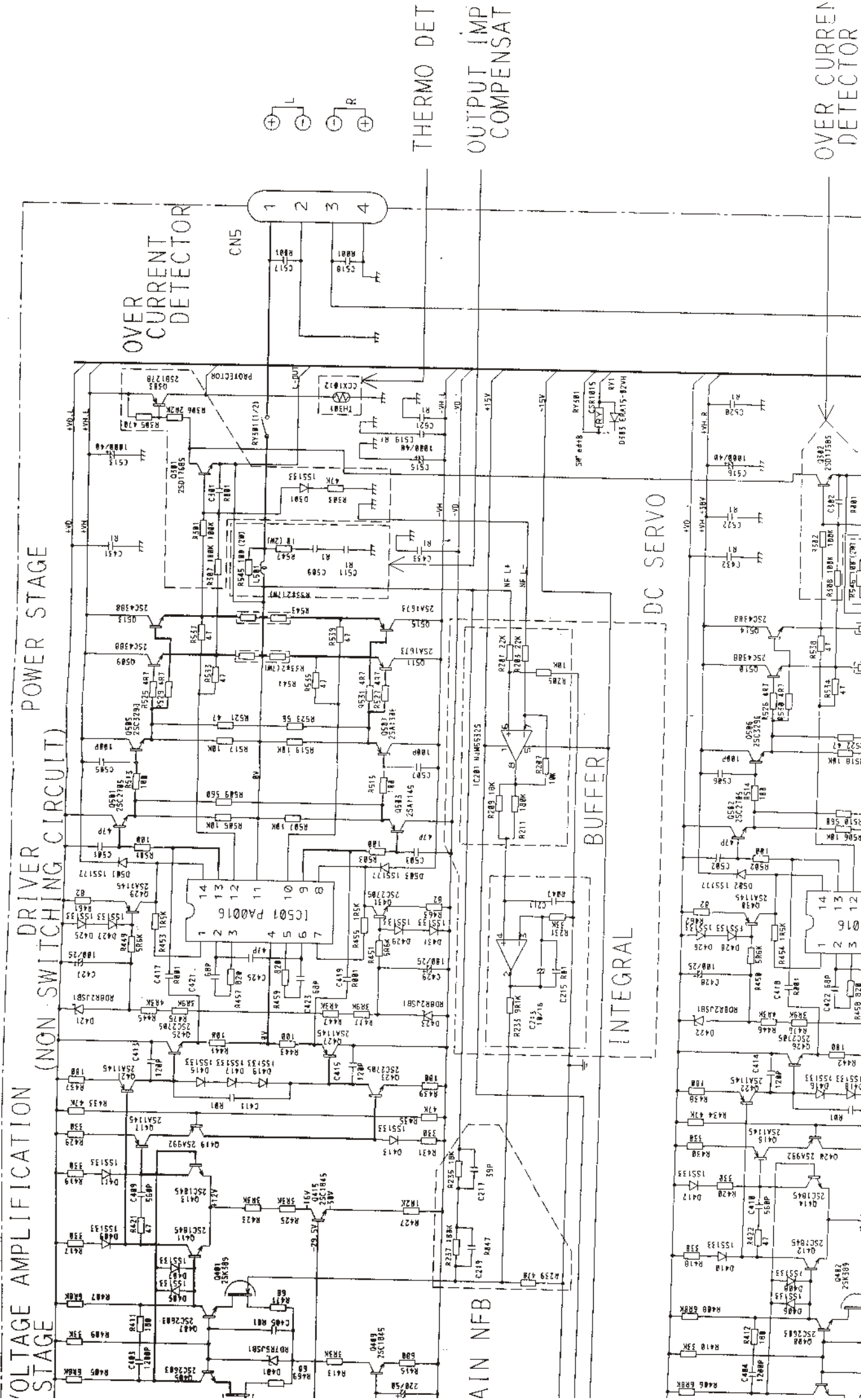
RGULA

SPICE SUPPRESSOR
POWER MOS
FET
DRIVE +, - VOLTAGE DETECTOR

OUTPUT MUTE AND

NOTE:
 Symbol in
 Symbol in

B1B - 14.4V
 33LUM1 - 14.4V
 ACC - 14.3V



THERMO DET
 OUTPUT IMP
 COMPENSAT

OVER CURREN
 DETECTOR

VOLTAGE AMPLIFICATION
 STAGE

DRIVER
 (NON SWITCHING CIRCUIT)

POWER STAGE

OVER
 CURRENT
 DETECTOR

CNS

1 2 3 4

AIN NFB

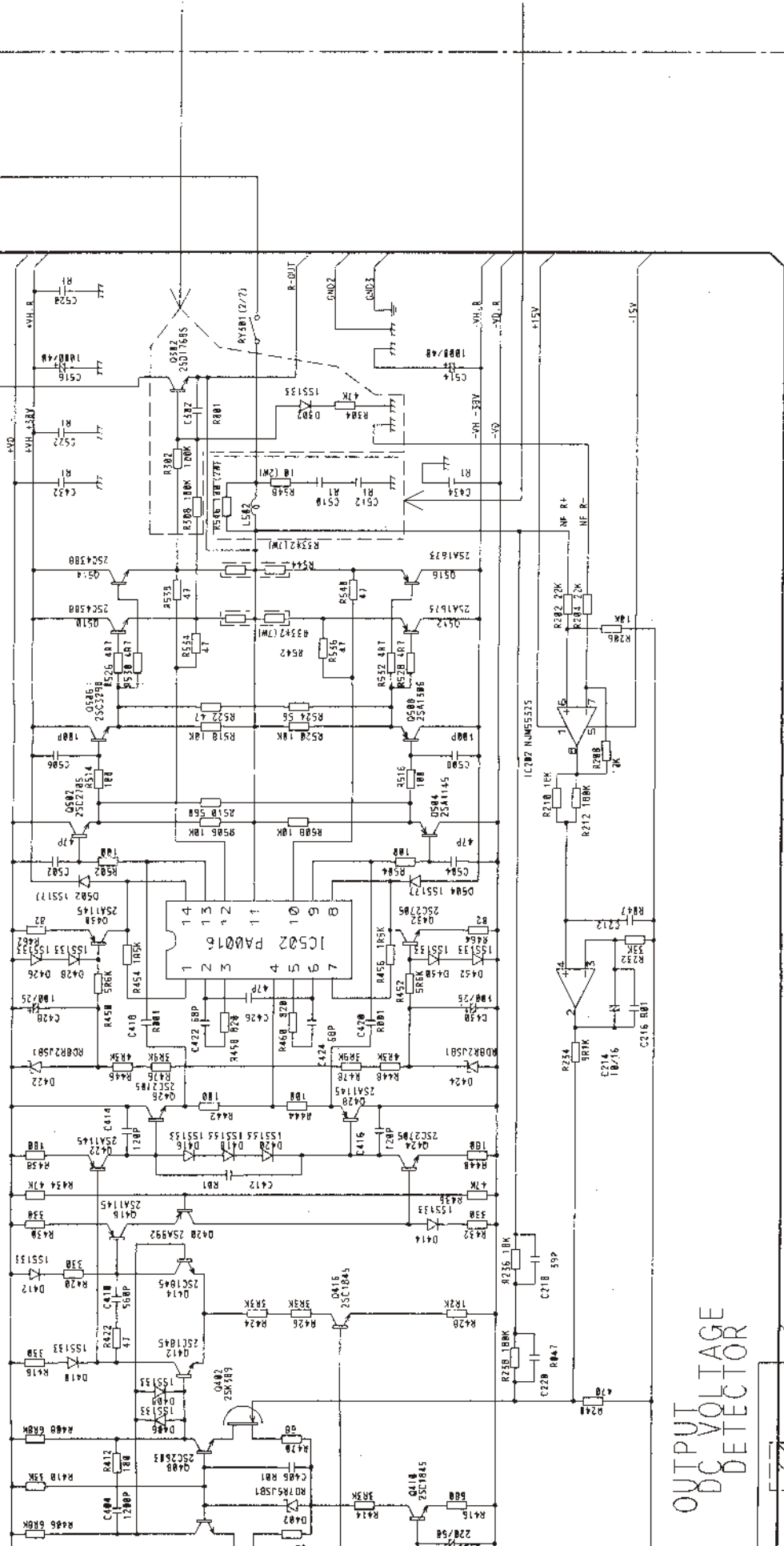
INTEGRAL

BUFFER

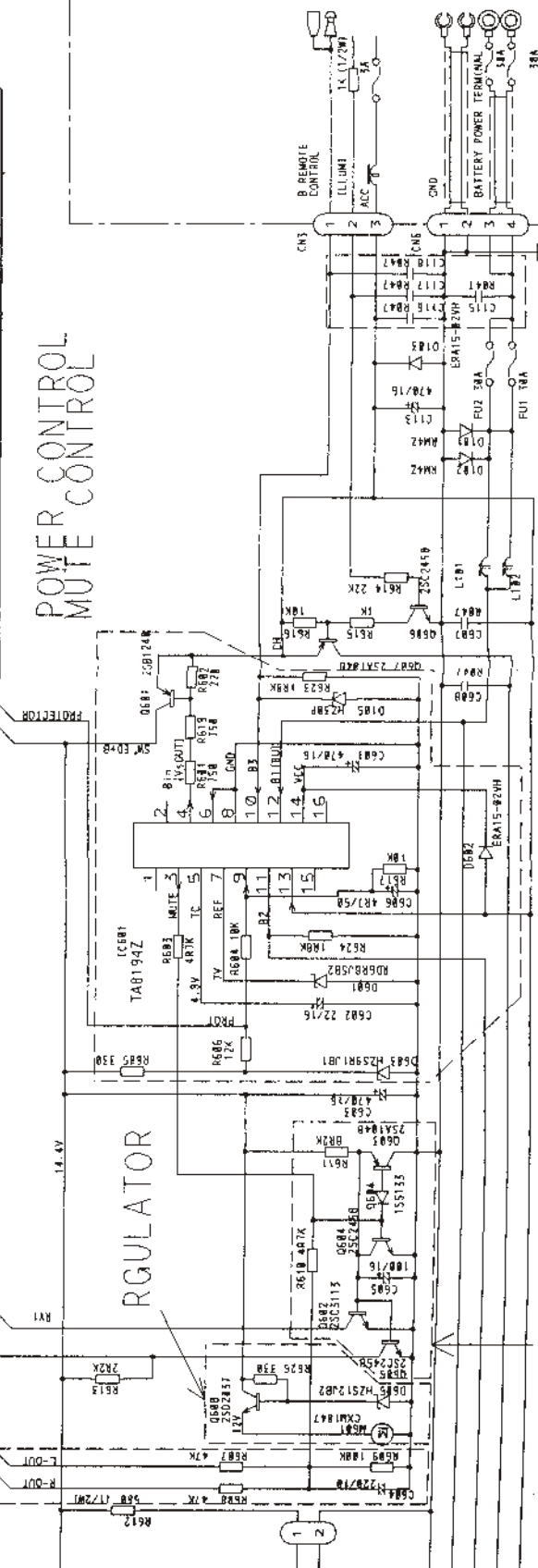
DC SERVO

OVER CURRENT
DETECTOR

OUTPUT IMP
COMPENSAT



POWER CONTROL
MUTE CONTROL



OUTPUT VOLTAGE
DC VOLTAGE
DETECTOR

REGULATOR